installation, start-up and service instructions

SINGLE PACKAGE ROOFTOP ELECTRIC COOLING/GAS HEATING UNITS

580G,H
Sizes 240-360

Cancels: II 580G,H-240-1 II 580G,H-240-2
11/1/97

CONTENTS

SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

⚠ **WARNING:** Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

⚠ **WARNING:**

1. Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Refer to the User's Information Manual provided with this unit for more details.
2. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

What to do if you smell gas:

1. DO NOT try to light any appliance.
2. DO NOT touch any electrical switch, or use any phone in your building.
3. IMMEDIATELY call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
4. If you cannot reach your gas supplier, call the fire department.

⚠ **WARNING:** Disconnect gas piping from unit when pressure testing at pressure greater than 0.5 psig. Pressures greater than 0.5 psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of 0.5 psig or less, a unit connected to such piping must be isolated by closing the manual gas valve(s).

INSTALLATION

I. PROVIDE UNIT SUPPORT

⚠ **CAUTION:** All panels must be in place when rigging. Unit is not designed for handling by fork truck.

A. Roof Curb

Assemble and install accessory roof curb in accordance with instructions shipped with the curb. Accessory roof curb and information required to field fabricate a roof curb or horizontal adapter are shown in Fig. 1. Install insulation, cant strips, roofing, and counter flashing as shown. Ductwork can be secured to roof curb before unit is set in place.

IMPORTANT: The gasketing of the unit to the roof curb is critical for a leak-proof seal. Install gasket supplied with the roof curb as shown in Fig. 1. Improperly applied gasket can result in air leaks and poor unit performance.

Curb should be level. This is necessary to permit unit drain to function properly. Unit leveling tolerance is shown in Fig 1. Refer to Accessory Roof Curb Installation Instructions for additional information as required. When accessory roof curb is used, unit may be installed on class A, B, or C roof covering material.

NOTE: On retrofit jobs, ductwork may be attached to old unit instead of roof curb. Be careful not to damage ductwork when removing old unit.

B. Alternate Unit Support

When the preferred curb or adapter cannot be used, support unit with sleepers using unit curb or adapter support area. If sleepers cannot be used, support long sides of unit (refer to Fig. 2 and 3) with 3 equally spaced 4-in. x 4-in. pads on each side. Unit may sag if supported by corners only.

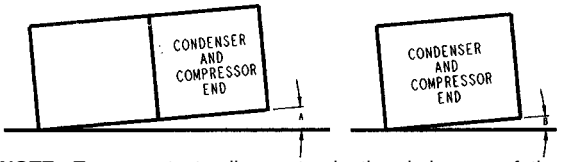
II. RIG AND PLACE UNIT

Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright, and do not drop. Use spreader bars over unit to prevent sling or cable damage. Rollers may be used to move unit across a roof. Level by using unit frame as a reference; leveling tolerance is shown in. Fig. 1. See Fig. 4 for additional information. Unit weight is shown in Table 1.

Four lifting lugs are provided on the unit base rails as shown in Fig. 4. Refer to rigging instructions on unit.

(Copy continued on page 7.)

NOTES:
1. Unless otherwise specified, all dimensions are to outside of part.
2. Roof curb accessory is shipped disassembled.
3. All roof curb parts are to be 16 ga galvanized steel.
4. Dimensions are in inches.

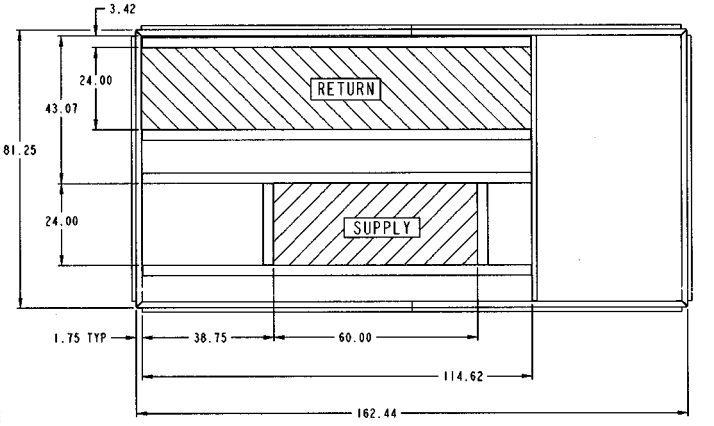


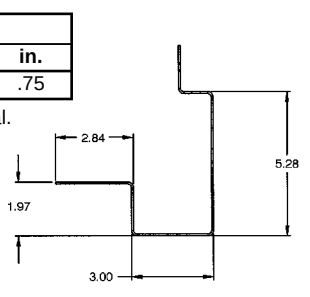
NOTE: To prevent standing water in the drain pan of the indoor section and the heat exchangers, UNIT CAN ONLY BE PITCHED AS SHOWN.

UNIT LEVELING TOLERANCES DIMENSIONS* (Degrees and Inches)

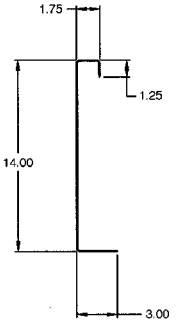
A		B	
Deg.	in.	Deg.	in.
1.0	2.9	.50	.75

*From edge of unit to horizontal.

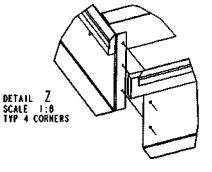


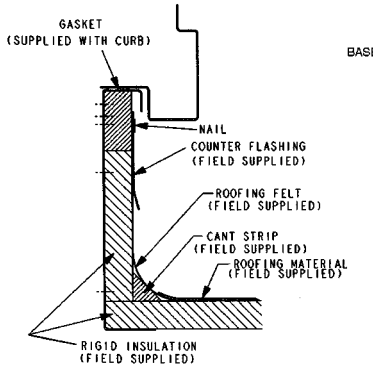


BASE RAIL CROSS SECTION TYP 2 SIDES (14 GAGE)



ROOF CURB CROSS SECTION TYP 4 SIDES (16 GAGE)





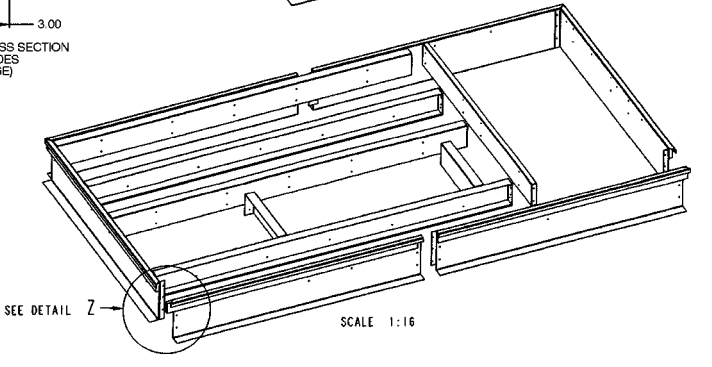
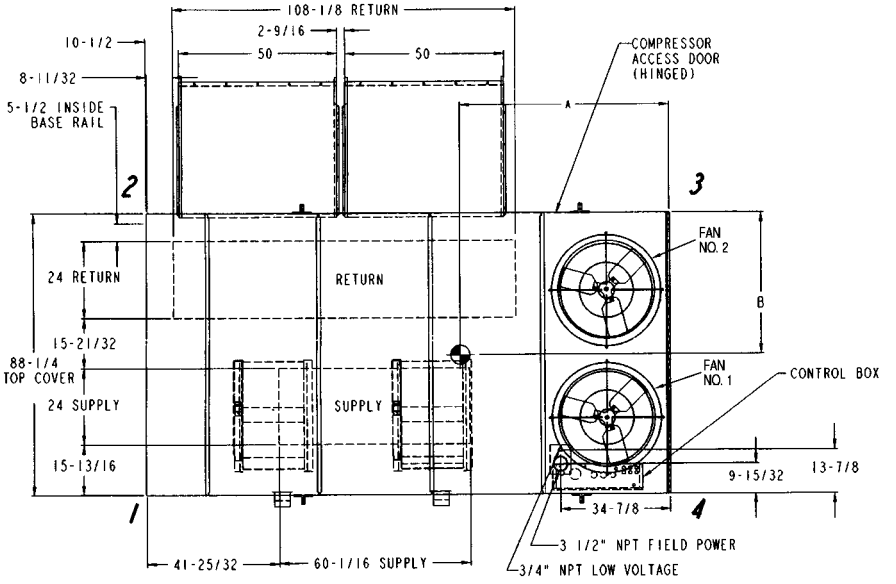
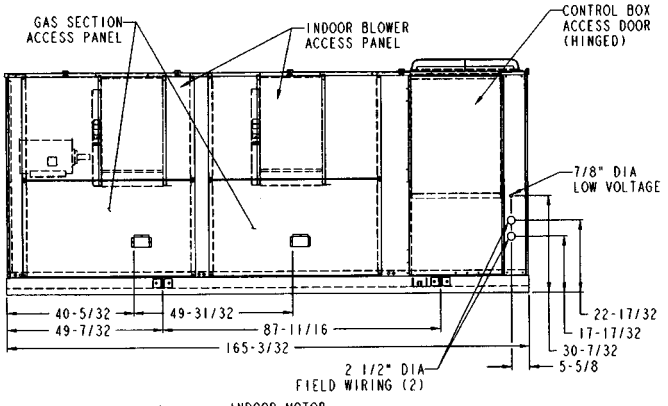
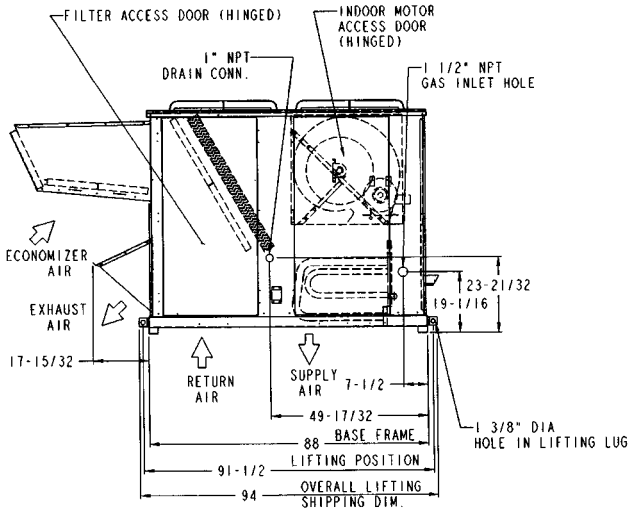
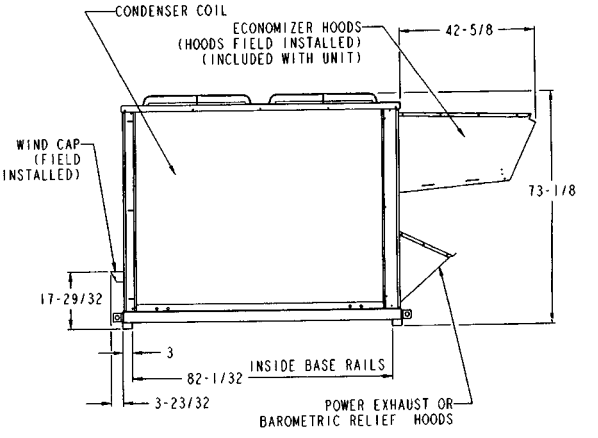


Fig. 1 — Roof Curb (Sizes 240-360)





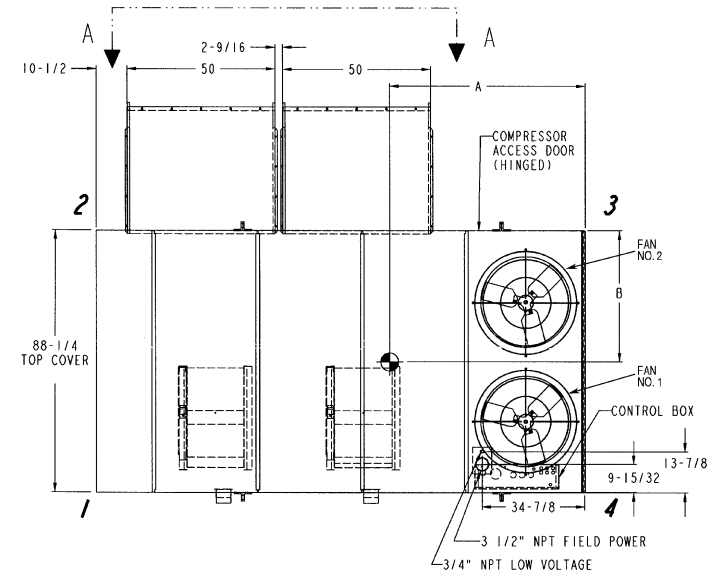


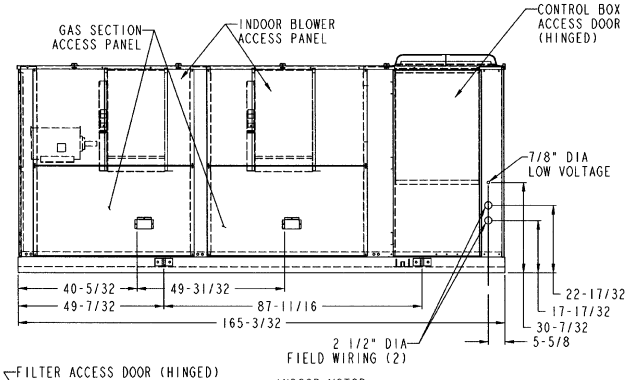


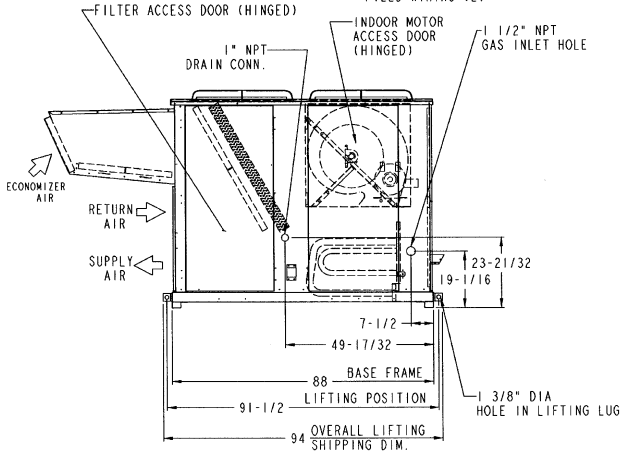
NOTES:
1. Weights include economizer (STD).
2. Center of gravity.
3. Do not locate adjacent units with flue discharge facing economizer inlet. Min. clearances to be:
   Adjacent Units: 15′-0″
   Top of Units: No Overhang
   Condenser Coil: 4′-0″
   Economizer Side: 6′-0″
   Heat Side: 4′-0″
   Filter Access Side: 10′-0″ (For Removal of Evaporator Coil)
4. For smaller service and operational clearances, contact Carrier Application Engineering department.
5. Bottom ducts designed to be attached to accessory roof curb. If unit is mounted on dunnage, it is recommended the ducts be supported by braces as done on accessory roof curb.

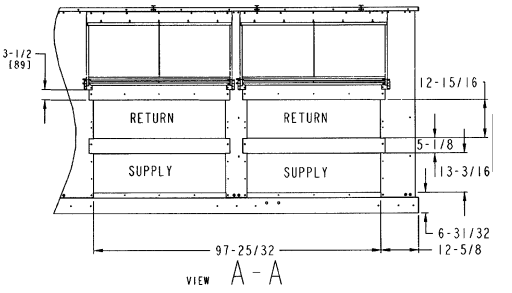
UNIT SIZE 580G	OPERATING WEIGHT	A	B	CORNER WEIGHT (lb)			
	lb	ft-in.	ft-in.	1	2	3	4
240 350	4176	6- 0⅜	3-6⅜	879	954	1220	1124
240 525	4256	6- 1⅝	3-6¹¹⁄₁₆	917	973	1218	1148
300 350	4262	5- 9⅝	3-8	899	899	1232	1232
300 525	4342	5-10⅛	3-8⅝	929	916	1240	1257
324 350	4262	5- 9⅝	3-8	899	899	1232	1232
324 525	4342	5-10⅛	3-8⅝	929	916	1240	1257
360 350	4262	5- 9⅝	3-8	899	899	1232	1232
360 525	4342	5-10⅛	3-8⅝	929	916	1240	1257

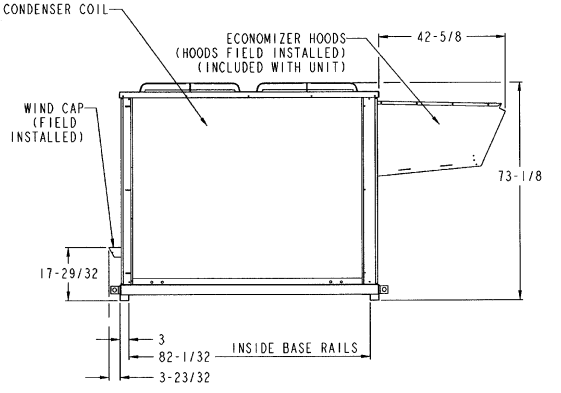
Fig. 2 — Base Unit Dimensions, 580G240-360







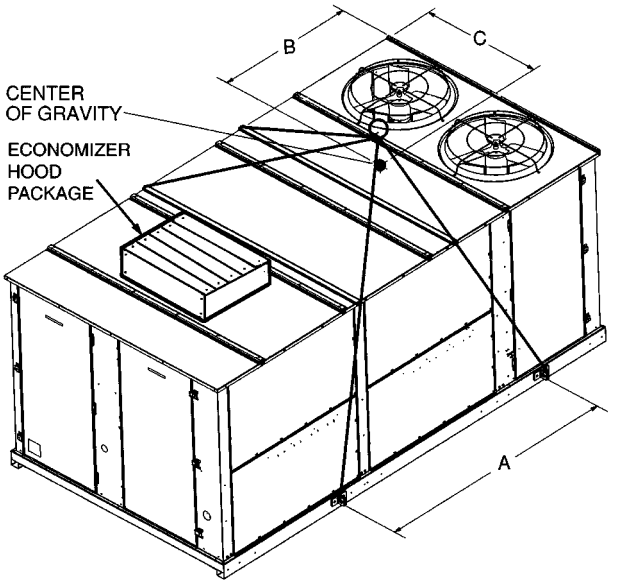




NOTES:
1. Weights include economizer (STD).
2. ⊕ Center of gravity.
3. Do not locate adjacent units with flue discharge facing economizer inlet. Min. clearances to be:
   Adjacent Units: 15′-0″
   Top of Units: No Overhang
   Condenser Coil: 4′-0″
   Economizer Side: 6′-0″
   Heat Side: 4′-0″
   Filter Access Side: 10′-0″ (For Removal of Evaporator Coil)
4. For smaller service and operational clearances, contact Application Engineering department.
5. Dimensions are in inches.
6. For side supply/return applications a single return and supply ductwork connection is recommended for covering both return and both supply openings.

UNIT SIZE 580H	OPERATING WEIGHT	A	B	CORNER WEIGHT (lb)			
	lb	ft-in.	ft-in.	1	2	3	4
240 350	4176	6- 0⅜	3-6⅜	879	954	1220	1124
240 525	4256	6- 1⁵⁄₁₆	3-6¹¹⁄₁₆	917	973	1218	1148
300 350	4262	5- 9⅝	3-8	899	899	1232	1232
300 525	4342	5-10⅛	3-8⁵⁄₁₆	929	916	1240	1257
324 525	4262	5- 9⅝	3-8	899	899	1232	1232
324 525	4342	5-10⅛	3-8⁵⁄₁₆	929	916	1240	1257
360 350	4262	5- 9⅝	3-8	899	899	1232	1232
360 525	4342	5-10⅛	3-8⁵⁄₁₆	929	916	1240	1257

Fig. 3 — Base Unit Dimensions, 580H240-360



⚠CAUTION: NOTICE TO RIGGERS: ALL PANELS MUST BE IN PLACE WHEN RIGGING.

NOTE: Rig with four cables and spread with two 92 in. (2337 mm) spreader bars. Maintain a distance of 74 in. (1880 mm) from top of unit to eyehook.

NOTE:
Add 32 lb (14.5 kg) for domestic crating.
Add 312 lb (142 kg) for export crating.
Add 220 lb (100 kg) for copper condenser coil.
Add 250 lb (113 kg) for power exhaust.

UNIT 580G,H	WEIGHT		A		B		C	
	lb	kg	in.	mm	in.	mm	in.	mm
240 350	4176	1894	87.68	2227	72.4	1839	42.4	1072
240 525	4256	1930			73.3	1862	42.7	1085
300 350	4262	1933			69.6	1768	44.0	1118
324 350								
360 350								
300 525	4342	1969			70.1	1781	44.3	1125
324 525								
360 525								

Fig. 4 — Rigging Label

Table 1 — Specifications

UNIT 580G,H	240			300			324			360		
NOMINAL CAPACITY (tons)	20			25			27			30		
OPERATING WEIGHT (lb)												
Unit												
Al/Al* (Lo Heat/Hi Heat)	4176/4256			4262/4342			4262/4342			4262/4342		
Al/Cu* (Lo Heat/Hi Heat)	4396/4476			4482/4562			4482/4562			4482/4562		
Roof Curb (14-in. curb)	365			365			365			365		
COMPRESSOR												
Type Ckt 1	06D328			06D328			06D537			06D537		
Ckt 2	06D818			06D328			06D328			06D537		
Number of Refrigerant Circuits	2			2			2			2		
Oil (oz) (Ckt 1, Ckt 2)	115, 88			115 ea.			115 ea.			115 ea.		
REFRIGERANT TYPE	R-22											
Operating Charge (lb-oz)												
Circuit 1†	25-0			25-0			25-0			25-0		
Circuit 2	31-0			25-0			25-0			25-0		
CONDENSER COIL	Cross-Hatched 3/8″ Copper Tubes, Aluminum Lanced, Aluminum Pre-Coated, or Copper Plate Fins											
Quantity	1			1			1			1		
Rows...Fins/in.	4...15			4...15			4...15			4...15		
Total Face Area (sq ft)	33.3			33.3			33.3			33.3		
CONDENSER FAN	Propeller Type											
Nominal Cfm	13,420			13,420			13,420			13,420		
Quantity...Diameter (in.)	2...30			2...30			2...30			2...30		
Motor Hp (1075 Rpm)	1			1			1			1		
EVAPORATOR COIL	Cross-Hatched 3/8″ Copper Tubes, Aluminum Plate Fins, Intertwined Circuits											
Rows...Fins/in.	4...15			4...15			4...15			4...15		
Total Face Area (sq ft)	31.7			31.7			31.7			31.7		
EVAPORATOR FAN	Centrifugal Type											
Quantity...Size (in.)	2...20x15			2...20x15			2...20x15			2...20x15		
Type Drive	Belt			Belt			Belt			Belt		
Nominal Cfm	8,000			10,000			11,000			12,000		
Motor Hp	5	10**	15	7.5	10**	15	10	15**	20	10	15**	20
Motor Frame Size												
Standard	S184T	S215T	D254T	S213T	S215T	D254T	S215T	D254T	S256T	S215T	D254T	S256T
High Efficiency	S184T	S215T	S254T	S213T	S215T	S254T	S215T	S254T	S256T	S215T	S254T	S256T
Motor Bearing Type	Ball			Ball			Ball			Ball		
Maximum Allowable Rpm	1200			1200			1200			1200		
Motor Pulley Pitch Diameter	4.8	4.4	5.7	5.4	6.1	5.5	4.4	4.9	5.9	4.4	5.7	5.9
Nominal Motor Shaft Diameter (in.)	1 1/8	1 3/8	1 5/8	1 3/8	1 3/8	1 5/8	1 3/8	1 5/8	1 5/8	1 3/8	1 5/8	1 5/8
Fan Pulley Pitch Diameter (in.)	12.4	8.6	9.1	12.4	11.1	8.7	9.4	8.1	8.7	9.0	9.1	8.7
Nominal Fan Shaft Diameter (in.)	1 15/16			1 15/16			1 15/16			1 15/16		
Belt, Quantity...Type	1...BX59	2...BX51	2...5VX530	1...BX59	1...5VX590	2...5VX530	2...BX52	2...5VX500	2...5VX530	2...BX51	2...5VX530	2...5VX530
Belt, Length (in.)	62	54	53	62	59	53	55	50	53	54	53	53
Pulley Center Line Distance (in.)	16.0-18.7	15.6-18.4	15.0-17.9	15.6-18.4		15.0-17.9	15.6-18.4	15.0-17.9		15.6-18.4	15.0-17.9	
Factory Speed Setting (rpm)	717	924	1096	773	962	1106	848	1059	1187	884	1096	1187
FURNACE SECTION												
Rollout Switch Cutout Temp (F)††	225			225			225			225		
Burner Orifice Diameter (in. ...drill size)												
Natural Gas Std	.111...34			.111...34			.111...34			.111...34		
Liquid Propane Alt	.089...43			.089...43			.089...43			.089...43		
Thermostat Heat Anticipator Setting (amps)												
Stage 1	0.1			0.1			0.1			0.1		
Stage 2	0.1			0.1			0.1			0.1		
Gas Input (Btuh) Stage 1 Low	262,500			262,500			262,500			262,500		
High	394,000			394,000			394,000			394,000		
Stage 2 Low	350,000			350,000			350,000			350,000		
High	525,000			525,000			525,000			525,000		
Efficiency (Steady State) (%)	82			82			82			82		
Temperature Rise Range	15-45/35-65			15-45/35-65			15-45/35-65			15-45/35-65		
Manifold Pressure (in. wg)												
Natural Gas Std	3.5			3.5			3.5			3.5		
Liquid Propane Alt	3.5			3.5			3.5			3.5		
Gas Valve Quantity	2			2			2			2		
Field Gas Connection Size (in.-FPT)	1.5			1.5			1.5			1.5		
HIGH-PRESSURE SWITCH (psig)												
Cutout	426			426			426			426		
Reset (Auto.)	320			320			320			320		
LOW-PRESSURE SWITCH (psig)												
Cutout	7			7			7			7		
Reset (Auto.)	22			22			22			22		
RETURN-AIR FILTERS												
Quantity...Size (in.)	10...20x24x2			10...20x24x2			10...20x24x2			10...20x24x2		
OUTDOOR-AIR FILTERS	8...16×25											
Quantity...Size (in.)	4...20×25											
POWER EXHAUST	Direct Drive, 3-Speed, Single Phase Motor (Factory Wired for High Speed), Forward-Curved Fan											
Motor, Quantity...Hp	4...1											
Fan, Diameter...Width (in.)	11...10											

LEGEND

Al — Aluminum
Cu — Copper

*Evaporator coil fin material/condenser coil fin material.
†Circuit 1 uses the lower portion of condenser coil; Circuit 2 uses the upper portion. All units have intertwined evaporator coils.

**Motor and drive shown will deliver approximately 2.5 in. net external static. For more fan motor data, see Table 2.
††Rollout switch is manual reset.

Table 2 — Evaporator Fan Motor Data

UNIT SIZE 580G,H	MOTOR HP	MOTOR SHAFT DIA. (in.)	FAN SHAFT SPEED (rpm)	MOTOR SHEAVE	MOTOR SHEAVE PITCH DIAMETER (in.)	BUSHING DIAMETER (in.)	FAN SHEAVE	FAN SHEAVE PITCH DIAMETER (in.)	BUSHING DIAMETER (in.)	BELT (QUANTITY)	OUTSIDE BELT LENGTH	BELT TENSION (lb at .24 in.)
240	5 10 15	1.12 1.38 1.62	717 924 1096	BK55 2BK50 2B5V56	4.8 4.4 5.7	None-1.125 None-1.375 B-1.625	1B5V124 2B5V86 2B5V90	12.4 8.6 9.1	B-1.9375 B-1.9375 B-1.9375	BX59 (2) BX51 (2) 5VX530	62 54 53	5.10 5.21 6.00
300	7.5 10 15	1.38 1.38 1.62	773 962 1106	BK60H 1B5V60 2B5V54	5.4 6.1 5.5	H-1.375 H-1.375 B-1.625	1B5V124 1B5V110 2B5V86	12.4 11.1 8.7	B-1.9375 B-1.9375 B-1.9375	BX59 5VX590 (2) 5VX530	62 59 53	6.48 7.37 6.12
324	10 15 20	1.38 1.62 1.62	848 1059 1187	2BK50 2B5V48 2B5V58	4.4 4.9 5.9	None-1.375 B-1.625 B-1.625	2B5V94 2B5V80 2B5V86	9.4 8.1 8.7	B-1.9375 B-1.9375 B-1.9375	(2) BX52 (2) 5VX500 (2) 5VX530	55 50 53	5.27 6.63 7.31
360	10 15 20	1.38 1.62 1.62	884 1096 1187	2BK50 2B5V56 2B5V58	4.4 5.7 5.9	H-1.375 B-1.625 B-1.625	2B5V90 2B5V90 2B5V86	9.0 9.1 8.7	B-1.9375 B-1.9375 B-1.9375	(2) BX51 (2) 5VX530 (2) 5VX530	54 53 53	5.24 6.00 7.31

NOTE: Motor shaft speed is 1750 rpm. The fan shaft diameter is $1^{11}/_{16}$ inches.

A. Positioning

Provide clearance around and above unit for airflow, safety, and service access (Fig. 2 and 3).

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air.

For proper unit operation, adequate combustion and ventilation air must be provided in accordance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute).

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

B. Roof Mount

Check building codes for weight distribution requirements.

III. FIELD FABRICATE DUCTWORK

Secure all ducts to building structure. Use flexible duct connectors between unit and ducts as required. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

To attach ductwork to roof curb, insert ductwork approximately 10 to 11 in. up into the curb. Connect ductwork to 14-gage roof curb material using sheet metal screws driven from inside the duct.

⚠ **WARNING:** For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install 90 degree elbow turns in the supply and return ductwork between the unit and the conditioned space. If a 90 degree elbow cannot be installed, then grilles of sufficient strength and density should be installed to prevent objects from falling into the conditioned space.

IV. UNIT DUCT CONNECTIONS

A. 580G Units

Unit is shipped for through-the-bottom duct connections. Ductwork openings are shown in Fig. 2. **Attach all ductwork to roof curb.** Air distribution is shown in Fig. 5. Refer to installation instructions shipped with accessory roof curb for more information.

B. 580H Units

Remove shipping covers from supply and return air openings. Attach field-supplied ductwork to unit. Use a single duct over both return openings and a single duct over **both** supply openings. See Fig. 3 for duct opening dimensions. Secure all ducts to the building structure. See Fig. 6. Use flexible duct connectors between unit and ducts as required.

Install accessory barometric relief or power exhaust in the field-fabricated return ductwork. Refer to Power Exhaust/Barometric Relief Damper Hood section for more information.

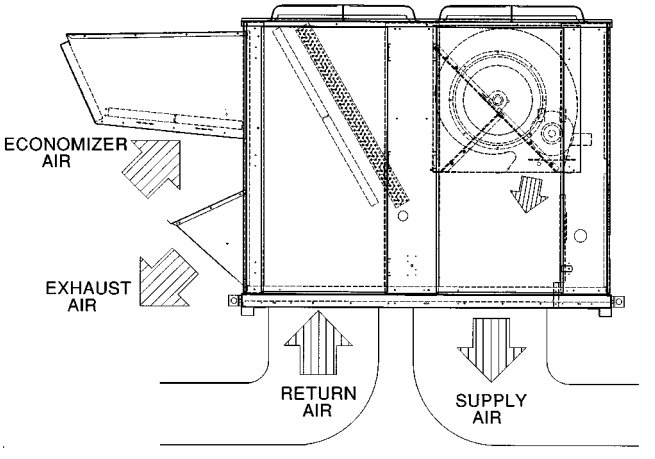


Fig. 5 — Air Distribution — Thru-the-Bottom

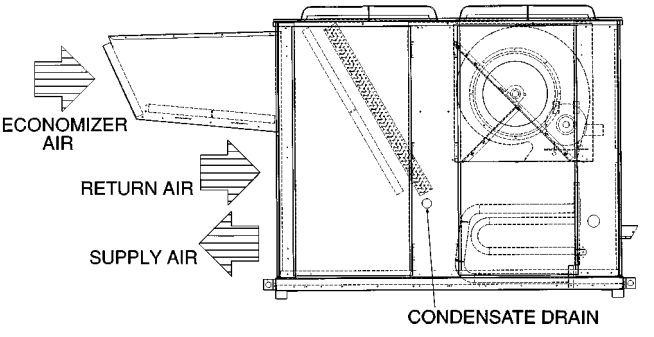


Fig. 6 — Air Distribution — Thru-the-Side

V. FLUE HOOD

Flue hood is shipped inside gas section of unit. To install, secure flue hood to access panel. See Fig. 7.

NOTE: When properly installed, flue hood will line up with combustion fan housing. See Fig. 8.

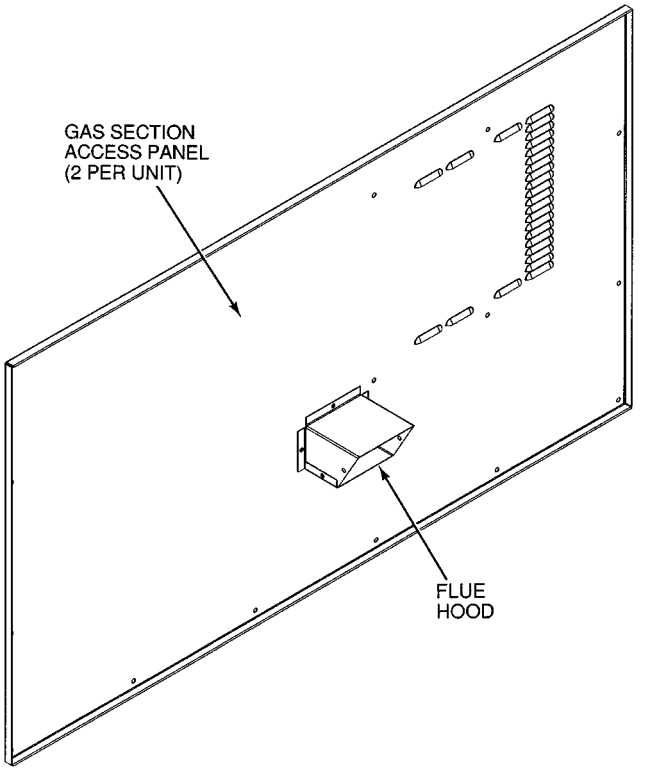


Fig. 7 — Flue Hood Location

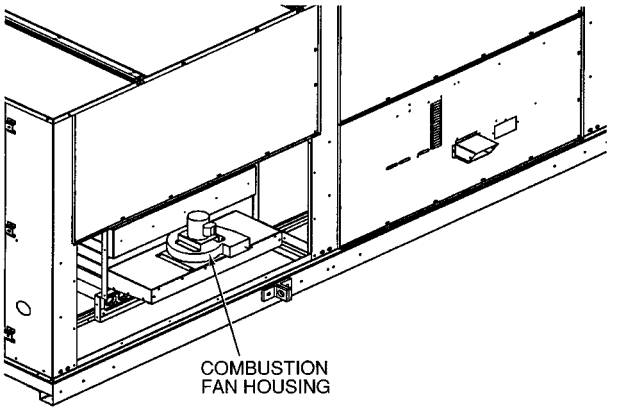


Fig. 8 — Combustion Fan Housing Location

VI. TRAP CONDENSATE DRAIN

See Fig. 2, 3, and 9 for drain location. Condensate drain is open to the atmosphere and must be trapped. Install a trapped drain at the drain location. One 1-in. NPT coupling is provided inside unit evaporator section for condensate drain connection. A trap at least 4-in. deep must be used. Trap must be installed to prevent freeze-up.

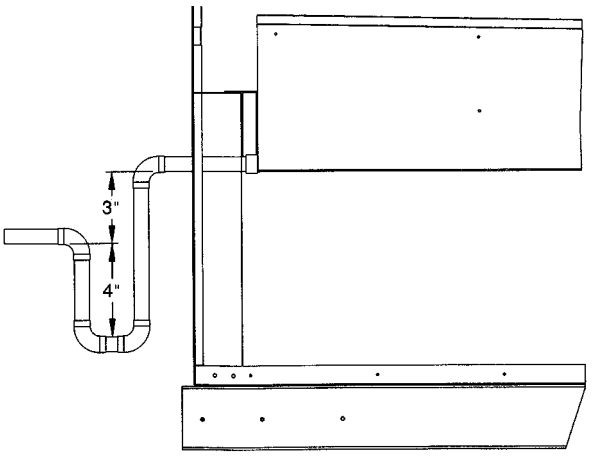


Fig. 9 — Condensate Drain Connections (Typical Roof Curb or Slab Mount Shown)

Condensate pans are sloped so that water will completely drain from the condensate pan to comply with indoor air quality guidelines.

VII. GAS PIPING

Unit is equipped for use with natural gas. Installation must conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1.

Install manual gas shutoff valve with a ⅛-in. NPT pressure tap for test gage connection at unit. Field gas piping must include sediment trap and union. See Fig. 10.

⚠ **WARNING:** Do not pressure test gas supply while connected to unit. Always disconnect union before servicing.

Natural gas pressure at unit gas connection must not be less than 5 in. wg or greater than 13.5 in. wg.

Size gas-supply piping for 0.5-in. wg maximum pressure drop. Do not use supply pipe smaller than unit gas connection.

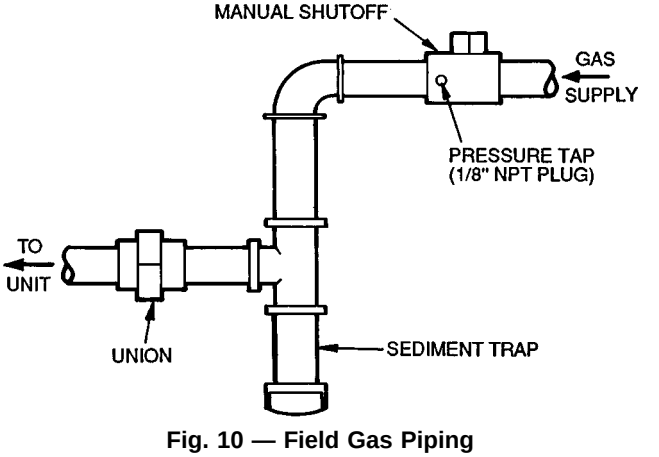


Fig. 10 — Field Gas Piping

VIII. ELECTRICAL CONNECTIONS

A. Controls Options

The standard constant volume (CV) units, as shipped, are operable as stand-alone units, using a standard (mechanical or electronic) 2-stage heat, 2-stage cool thermostat.

With a standard thermostat (programmable is optional), heating and cooling operation is set by space temperature. The standard DDC (direct digital controls) are installed in the control box. The DDC control board diagram is shown in Fig. 11.

Features with Thermostat Control of Unit

- two-stage heating
- two-stage cooling
- control of unit using Y1, Y2, W1, W2, and G thermostat inputs
- control of the indoor fan
- outdoor-air temperature/supply-air temperature monitoring
- control of modulating economizer damper to provide free cooling when outdoor conditions are suitable, using supply-air temperature as a control point
- control of the economizer damper and indoor fan to obtain unoccupied free cooling
- provide power exhaust output to an external power exhaust controller
- support a field test for field checkout
- control of 2 stages of CV power exhaust
- compressor time delay for power up and minimum off and on times

An electronic expansion board may be field-installed to provide the following features:

- control of modulating economizer damper to maintain indoor air quality (IAQ) when outdoor conditions are suitable

NOTE: The IAQ sensor must be set for current output (4 to 20 mA). This requires removing the sensor cover and removing a jumper on the sensor. See Fig. 12.

- provide discrete inputs for fan status, filter status, field-applied status, and demand limit
- provide an output for the external alarm light indicator
- provide power exhaust fire outputs for direct control of power exhaust stages during fire or smoke control modes
- control of smoke control modes including evacuation, smoke purge, pressurization, and fire shutdown (non-modulating or modulating power exhaust required)

B. Power Wiring

Units are factory wired for the voltage shown on the unit nameplate. The main terminal block is suitable for use with aluminum or copper wires.

When installing units, provide a disconnect per NEC (National Electrical Code) of adequate size (MOCP [maximum overcurrent protection] of unit is on the informative plate). All field wiring must comply with NEC and all local codes. Size wire based on MCA (minimum circuit amps) on the unit informative plate. See Fig. 13 for power wiring connections to the unit power terminal block and equipment ground.

The main power terminal block is suitable for use with aluminum or copper wire. See Fig. 13. Units have circuit breakers for compressors, fan motors, and control circuit. If required by local codes, provide an additional disconnect, per NEC and local codes requirements, of adequate size (Table 3). Whenever external electrical sources are used, unit must be electrically grounded in accordance with local codes, or in absence of local codes, with NEC, ANSI C1-latest year.

All field wiring must comply with NEC and local code requirements.

C. Field Power Supply

Unit is factory wired for voltage shown on nameplate. See Table 3 for electrical data.

Field wiring can be brought into the unit from bottom (through basepan and roof curb) or through side of unit (corner post next to control box).

A 3½-in. NPT knockout for field power wiring and a ¾-in. NPT knockout for 24-v control wiring are provided in basepan. In the side post, there are two 2½-in. knockouts for the field power wiring. See Fig. 2 and 3. If control wiring is to be brought in through the side of unit, a ⅞-in. diameter hole is provided in the condenser side post next to the control box.

If disconnect box is mounted to corner post, be careful not to drill any screws into the condenser coil.

Routing Through Bottom of Unit

If wiring is brought in through bottom of unit, use field-supplied watertight conduit to run power wiring from basepan out through bottom 3½-in. hole to the disconnect box and back into unit to the main control box.

Use strain relief going into control box through 2½-in. diameter hole provided. After wires are in unit control box, connect to power terminal block (see Power Wiring section on this page).

Low-voltage wiring must be run in watertight conduit from the basepan to control box and through 1-in. diameter hole provided in bottom of unit control box. Field-supplied strain relief must be used going into the box. After wiring is in control box, make connections to proper terminals on terminal blocks (see Field Control Wiring section on page 11).

Install conduit connector in unit basepan or side panel openings provided. Route power and ground lines through connector to connections in unit control box as shown on unit wiring diagram and Fig. 13.

Routing Through Side of Unit

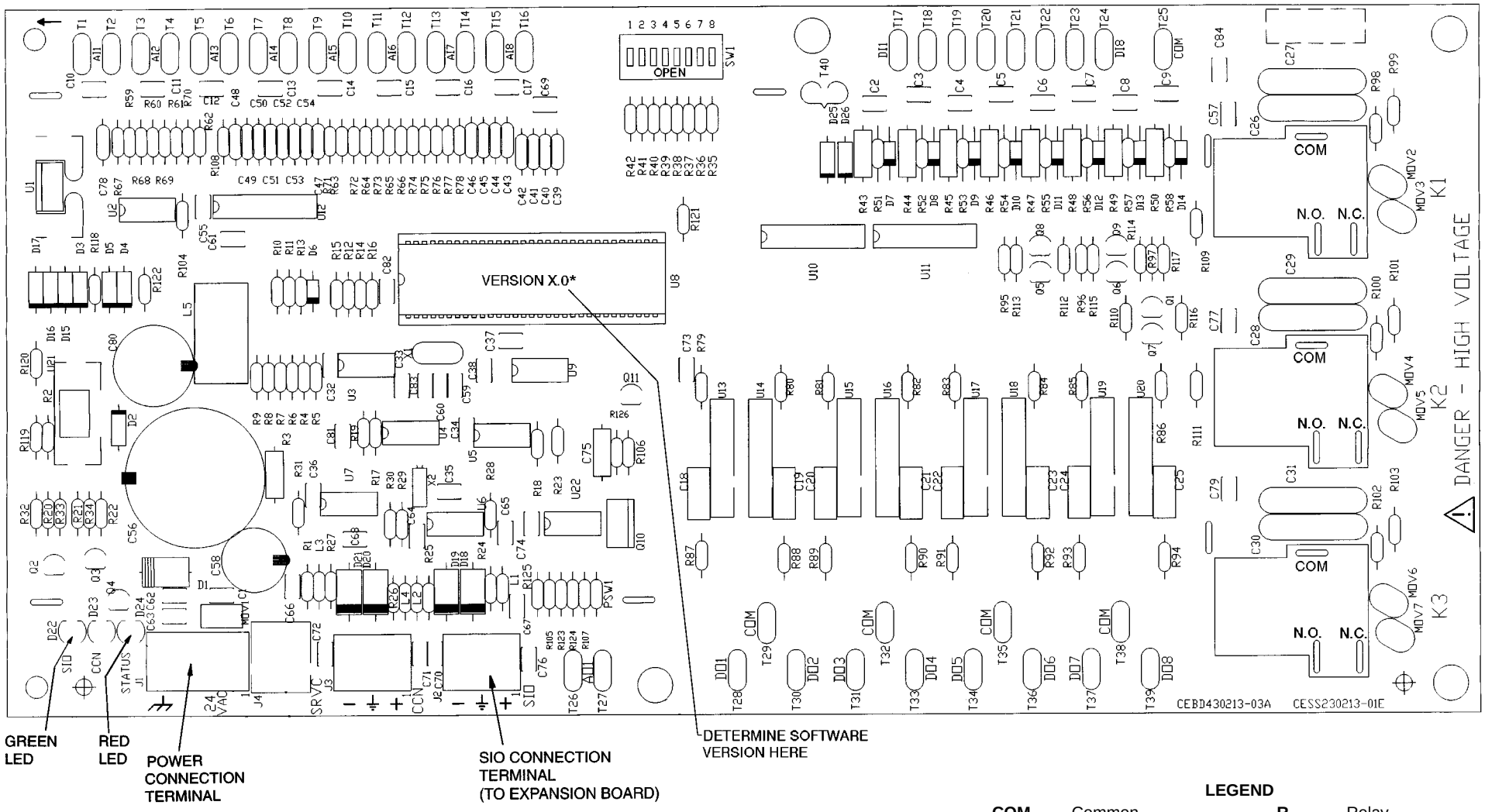
Route power wiring in field-supplied watertight conduit into unit through 2½-in. hole. Strain relief (field supplied) must be used in hole.

Use field-supplied strain relief going into control box through 2½-in. diameter hole provided. After wires are in unit control box, connect to power terminal block (see Power Wiring section on this page).

Bring low-voltage control wiring through factory-drilled ⅞-in. diameter hole in condenser side post. Use strain relief going into ⅞-in. diameter hole in bottom of unit control box.

After wiring is in control box, make connection to proper terminals on terminal blocks (see Field Control Wiring section on page 11).

⚠ **WARNING:** The unit must be electrically grounded in accordance with local codes and NEC ANSI/NFPA 70 (National Fire Protection Association).



LEGEND

COM	— Common	**R**	— Relay
D	— Diode	**SIO**	— Serial Input/Output
LED	— Light-Emitting Diode	**SW**	— Switch
N.C.	— Normally Closed	**T**	— Terminal
N.O.	— Normally Open		

*Where X is the unit control software version number (1 or 2).

Fig. 11 — Control Board Diagram

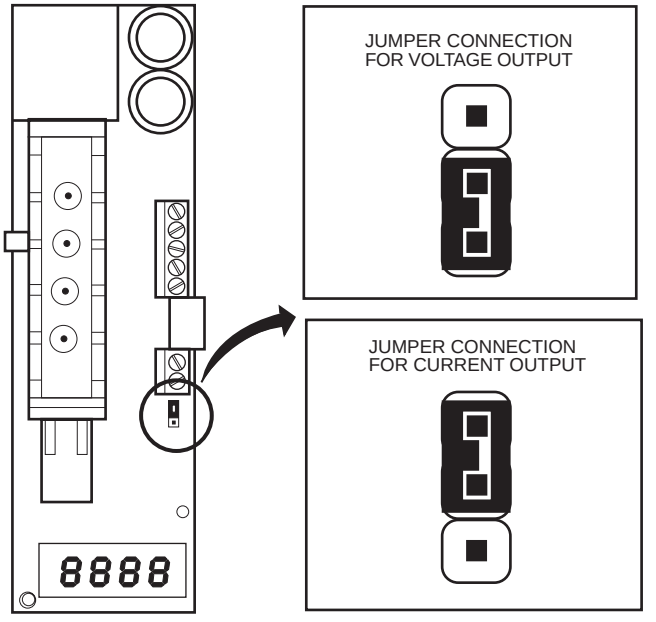
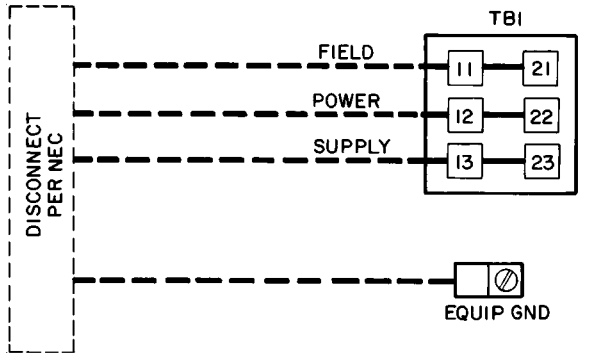


Fig. 12 — Indoor Air Quality Sensor Configuration



LEGEND

EQUIP — Equipment
GND — Ground
NEC — National Electrical Code
TB — Terminal Block

NOTE: TB1 Maximum wire size is 500 MCM.

Fig. 13 — Field Power Wiring Connections

Operating voltage to compressor must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2% and the current must be balanced within 10%.

Use the formula in Table 3 to determine the percentage of voltage imbalance.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

On 208/230-v units, transformer no. 1 is wired for 230-v. If 208/230-v unit is to be run with 208-v power supply, the transformer must be rewired as follows:

1. Remove cap from red (208-v) wire.
2. Remove cap from spliced orange (230-v) wire. Disconnect orange wire from black unit power wire.
3. Cap orange wire.
4. Splice red wire and black unit power wire. Cap wires.

IMPORTANT: Be certain unused wires are capped. Failure to do so may damage the transformers.

D. Field Control Wiring

Install an approved accessory thermostat. Control box diagram is shown in Fig. 14.

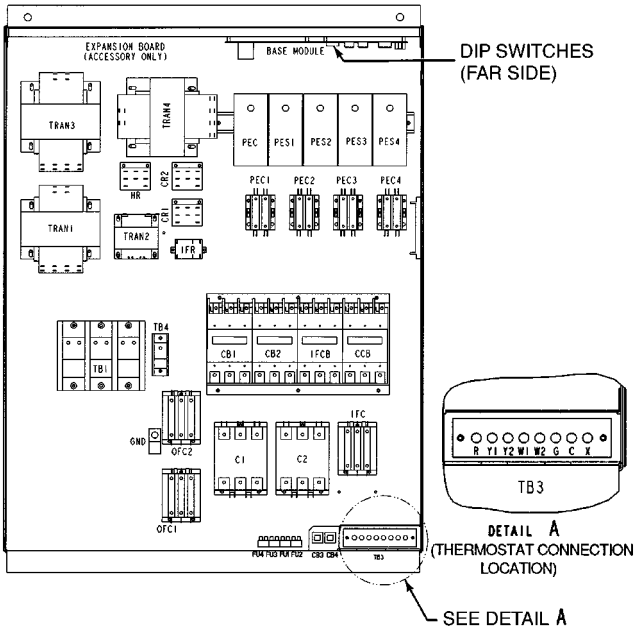
Thermostat Wiring

Install an approved accessory thermostat assembly (per current price pages) according to the installation instructions included with the accessory, or these instructions. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature.

Route thermostat cable or equivalent single leads of no. 18 AWG (American Wire Gage) colored wire from subbase terminals to low-voltage connections as shown on unit label wiring diagram and in Fig. 15.

NOTE: For wire runs up to 50 ft, use no. 18 AWG insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C minimum). All wire larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.

Set heat anticipators settings to .1 for all voltages. Settings may be changed slightly to provide a greater degree of comfort for a particular installation.



LEGEND

C — Compressor/Contactor
CB — Circuit Breaker
DIP — Dual In-Line Package
FU — Fuse
HR — Heater Relay
IF — Indoor Fan
OF — Outdoor Fan
PEC — Power Exhaust Controller
TB — Terminal Block
TRAN — Transformer

Fig. 14 — Control Box Diagram

Table 3— Electrical Data — 580G,H240-360

UNIT SIZE 580G,H	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR No. 1		COMPRESSOR No. 2		OFM			IFM		POWER EXHAUST		COMBUSTION FAN MOTOR	POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	FLA	MCA	MOCP*
240	208/230	187	254	39.1	228	25.6	160	2	1	5.3	5	16.7/15.2	— 23.6	— 41.6	0.96 0.96	101.8/100.3 125.4/123.9	125/125 150/150
											10	30.8/28.0	— 23.6	— 41.6	0.96 0.96	115.9/113.1 139.5/136.7	150/150 175/175
											15	46.2/42.0	— 23.6	— 41.6	0.96 0.96	131.3/127.1 154.9/150.7	150/150 175/175
	460	414	508	19.9	114	11.5	80	2	1	2.7	5	7.6	— 12.6	— 23.6	0.50 0.50	49.4 62.0	60 80
											10	14.0	— 12.6	— 23.6	0.50 0.50	55.8 68.4	70 80
											15	21.0	— 12.6	— 23.6	0.50 0.50	62.8 75.4	80 90
	575	518	632	16.0	91	9.6	64	2	1	2.4	5	6.1	— 12.6	— 23.6	0.50 0.50	40.5 53.1	50 60
											10	11.0	— 12.6	— 23.6	0.50 0.50	45.4 58.0	60 70
											15	17.0	— 12.6	— 23.6	0.50 0.50	51.4 64.0	60 80
300	208/230	187	254	39.1	228	39.1	228	2	1	5.3	7.5	24.2/22.0	— 23.6	— 41.6	0.96 0.96	122.8/120.6 146.4/144.2	150/150 175/175
											10	30.8/28.0	— 23.6	— 41.6	0.96 0.96	129.4/126.6 153.0/150.2	150/150 175/175
											15	46.2/42.0	— 23.6	— 41.6	0.96 0.96	144.8/140.6 168.4/164.0	175/175 200/200
	460	414	508	19.9	114	19.9	114	2	1	2.7	7.5	11.0	— 12.6	— 23.6	0.50 0.50	61.2 73.8	80 90
											10	14.0	— 12.6	— 23.6	0.50 0.50	64.2 76.8	80 90
											15	21.0	— 12.6	— 23.6	0.50 0.50	71.2 83.8	90 100
	575	518	632	16.0	91	16.0	91	2	1	2.4	7.5	9.0	— 12.6	— 23.6	0.50 0.50	49.8 62.4	60 70
											10	11.0	— 12.6	— 23.6	0.50 0.50	51.8 64.4	60 80
											15	17.0	— 12.6	— 23.6	0.50 0.50	57.8 70.4	70 80

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Fuse or HACR circuit breaker.

or

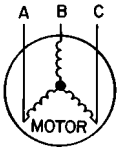
NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent voltage imbalance.

   % Voltage Imbalance

   $$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

EXAMPLE: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 − 452 = 5 v
(BC) 464 − 457 = 7 v
(AC) 457 − 455 = 2 v

Maximum deviation is 7 v.

Determine percent voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Table 3— Electrical Data — 580G,H240-360 (cont)

UNIT SIZE 580G,H	NOMINAL VOLTAGE (3 Ph 60 Hz)	VOLTAGE RANGE		COMPRESSOR No. 1		COMPRESSOR No. 2		OFM			IFM		POWER EXHAUST		COMBUSTION FAN MOTOR	POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	FLA	MCA	MOCP*
324	208/230	187	254	57.1	266	39.1	228	2	1	5.3	10	30.8/28.0	—/23.6	—/41.6	0.96/0.96	151.9/149.1 175.5/172.7	200/200 225/225
											15	46.2/42.0	—/23.6	—/41.6	0.96/0.96	167.3/163.1 190.9/186.7	200/200 225/225
											20	59.4/54.0	—/23.6	—/41.6	0.96/0.96	180.5/175.1 204.1/198.7	225/225 250/250
	460	414	508	25.6	120	19.9	114	2	1	2.7	10	14.0	—/12.6	—/23.6	0.50/0.50	71.3 83.9	90 100
											15	21.0	—/12.6	—/23.6	0.50/0.50	78.3 90.9	100 110
											20	27.0	—/12.6	—/23.6	0.50/0.50	84.3 96.9	100 110
	575	518	632	20.5	96	16.0	91	2	1	2.4	10	11.0	—/12.6	—/23.6	0.50/0.50	57.4 70.0	70 90
											15	17.0	—/12.6	—/23.6	0.50/0.50	63.4 76.0	80 90
											20	22.0	—/12.6	—/23.6	0.50/0.50	68.4 81.0	80 100
360	208/230	187	254	57.1	266	57.1	266	2	1	5.3	10	30.8/28.0	—/23.6	—/41.6	0.96/0.96	169.9/167.1 193.5/190.7	225/200 250/225
											15	46.2/42.0	—/23.6	—/41.6	0.96/0.96	185.3/181.1 208.9/204.7	225/225 250/250
											20	59.4/54.0	—/23.6	—/41.6	0.96/0.96	198.5/193.1 222.1/216.7	250/250 275/250
	460	414	508	25.6	120	25.6	120	2	1	2.7	10	14.0	—/12.6	—/23.6	0.50/0.50	77.0 89.6	100 110
											15	21.0	—/12.6	—/23.6	0.50/0.50	84.0 96.6	100 110
											20	27.0	—/12.6	—/23.6	0.50/0.50	90.0 102.6	110 125
	575	518	632	20.5	96	20.5	96	2	1	2.4	10	11.0	—/12.6	—/23.6	0.50/0.50	61.9 74.5	80 90
											15	17.0	—/12.6	—/23.6	0.50/0.50	67.9 80.5	80 100
											20	22.0	—/12.6	—/23.6	0.50/0.50	72.9 85.5	90 100

LEGEND

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HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
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OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Fuse or HACR circuit breaker.

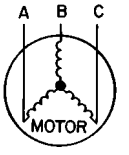
or

NOTES:

1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent voltage imbalance.

   $$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

EXAMPLE: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 − 452 = 5 v
(BC) 464 − 457 = 7 v
(AC) 457 − 455 = 2 v

Maximum deviation is 7 v.

Determine percent voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

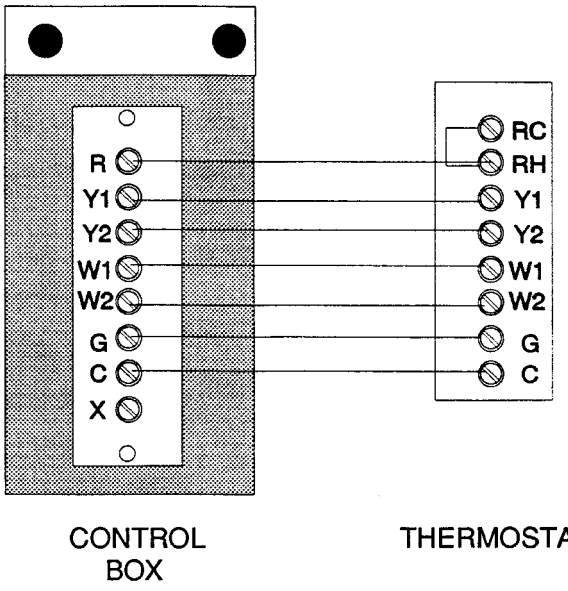


Fig. 15 — Field Control Thermostat Wiring

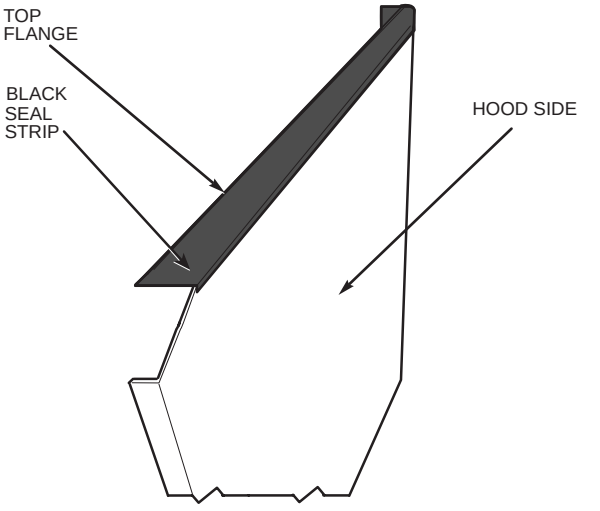


Fig. 16 — Adding Seal Strip to Top of Hood Sides

IX. OUTDOOR-AIR INLET ASSEMBLY

A. Economizer

NOTE: If accessory power exhaust or barometric relief packages are being added to the unit, install power exhaust or barometric relief before installing economizer hoods.

Economizer Hood Assembly

The economizer hood is shipped in a package secured to the outside of the unit and must be field assembled. There are 2 hoods on every unit. The 580H units are side supply and side return. The return duct limits access to economizer filters from below. Filter tracks (mounting angle without tabs) must be installed correctly to allow access to economizer filters from each side.

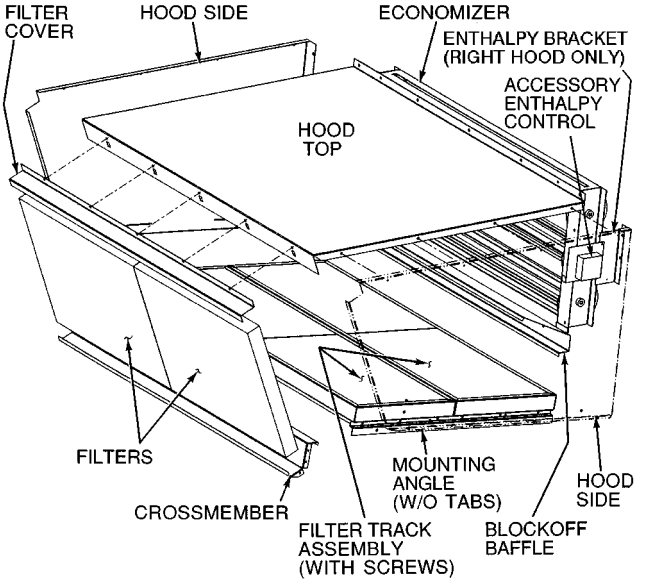
NOTE: Before assembly of the economizer hood, check along the outer edges of the economizer assembly for any seal strip protruding past the flanges. Trim the excess seal strip so that it is flush with the economizer assembly flanges.

Perform the following procedure to assemble the economizer hood:

1. a. Apply black seal strip (provided in package) to outside top edge of hood sides. Wrap seal strip over to cover top flange (4 hood sides). Make certain seal strip covers screw holes. Allow strip to overhang ⅛ in. past end opposite mounting flange. See Fig. 16.
   b. Assemble hood sides, top, and cross member with gasketed screws provided. See Fig. 17.
   c. Attach 10 green speed clips (provided) to hood top.
   d. Apply black seal strip to mounting flanges (cover holes) of hood sides. See Fig. 18.

NOTE: Each hood assembly has a slotted side that should be adjacent to the other hood when mounted to the unit.

   e. Apply black seal strip to hood top mounting flange. Seal strip of hood top mounting flange must press against seal strip of hood side mounting flanges. See Fig. 19.
   f. Add gray foam strip (provided) to cross members at bottom tray. See Fig. 20.



NOTE: Left side economizer hood has mounting angle without tabs and filter track assembled end on opposite side.

Fig. 17 — Economizer Hood Assembly (Right-Side Economizer Hood Shown) Exhaust Mounting Details

   g. Place gray foam strip on inside of slotted hood side between filter and cross member opposite mounting end. See Fig. 21.
   h. Attach gray foam strip to blockoff baffle on outer face area of flange. See Fig. 22.
2. Remove the screws on each end and along top of damper assembly of unit. Remove top 2 screws on each side of filter panel under damper assembly. Set hood assembly in place and attach to unit using these screws.
3. Attach accessory enthalpy bracket on hood side furthest from control box end. Locate bracket on inside upper right hand corner using hood mounting holes. Mount outdoor-air thermistor to enthalpy bracket (if purchased). Attach and wire enthalpy assembly. Place quick connects on enthalpy wires.

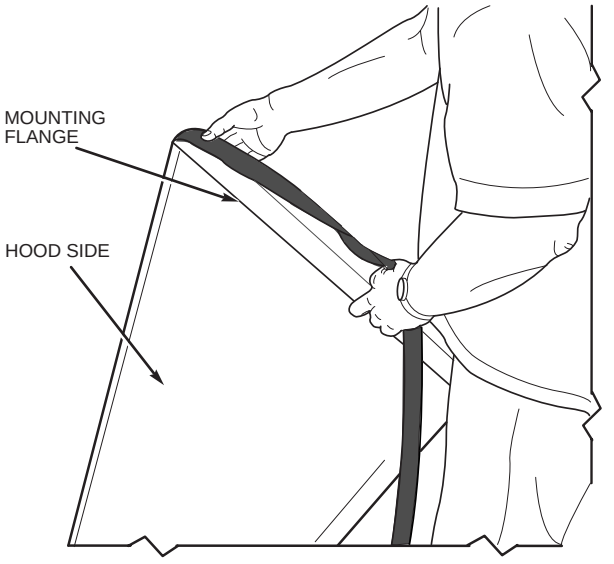


Fig. 18 — Adding Seal Strip to Mounting Flange of Hood Sides

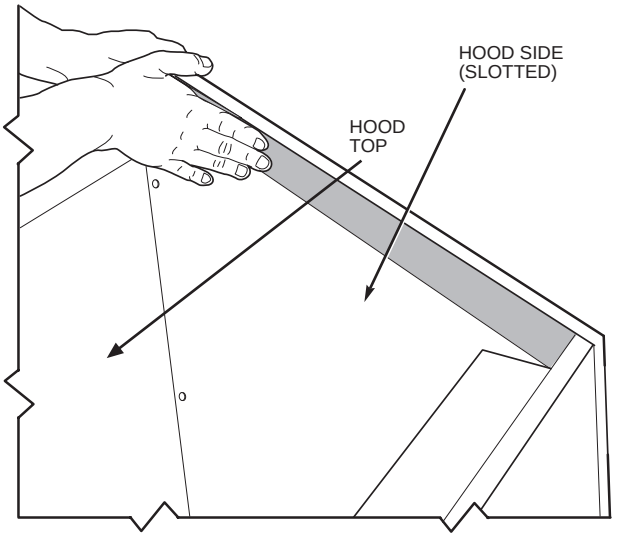


Fig. 21 — Adding Foam Strip to Hood Side

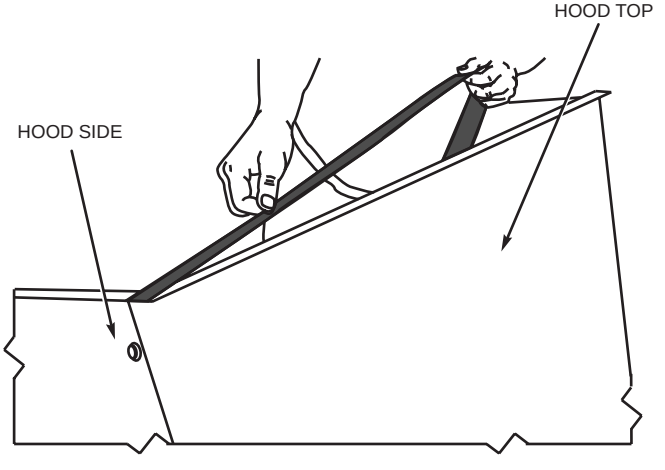


Fig. 19 — Add Seal Strip to Hood Top Mounting Flange

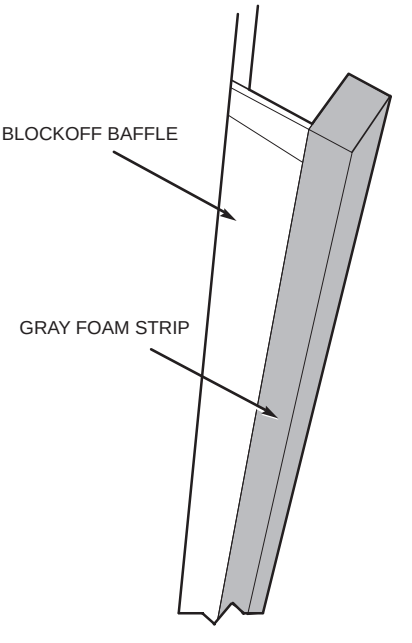


Fig. 22 — Adding Foam Strip To Blockoff Baffle

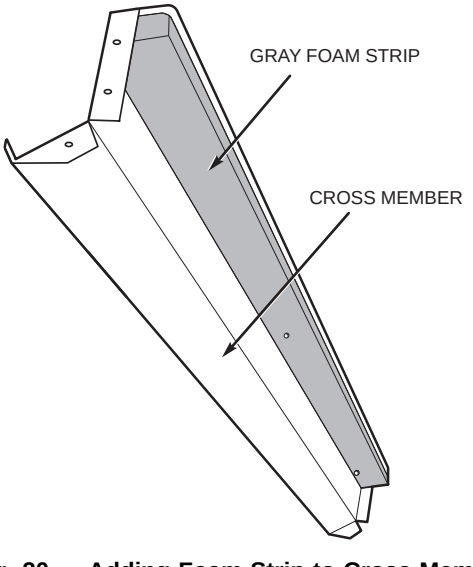


Fig. 20 — Adding Foam Strip to Cross Member

4. Remove screws along bottom of damper assembly. Locate and mount blockoff baffle using these screws.
5. Assemble 2 filter tracks side-by-side with the assembled ends together.
6. a. Attach mounting angle (without tabs) to the assembled end of the filter track. See Fig. 23.
   b. Attach 6 green clips (provided) to mounting angles. Engagement section of clip faces inside of rack.
   c. Attach remaining mounting angle (with tabs) to other end of the filter track with no. 10 screws provided. See Fig. 24.
7. a. Place filter track assembly in bottom of hood by placing tabbed end into slotted side (with tab on bottom) and attaching opposite end to hood with speed clips and gasketed screws provided. Tabs can be hand bent after inserted into the side.

NOTE: The filter track assembly end with screws should face away from the other hood when mounted on the unit.

NOTE: Tabs from both filter tracks will be in the same space. After one filter track has been inserted into board, bend the tabs so they will not interfere with installation of the second hood.

   b. Attach black seal strip to filter cover. Seal strip should be applied to flange (covering holes) and center of large flange. See Fig. 25.
8. Slide two 20 x 25-in. filters into cross members of hood assembly. Attach filter cover over filters with screws and speed clips provided.

Minimum Damper Position Setting

Setting of the outdoor air damper position is performed in conjunction with a shortened version of the field run test. This is performed by first opening DIP switch no. 4 then no. 6.

The outdoor-air damper closes. The control allows 90 seconds for the damper to close in case it is in the full open position. Next, the indoor-fan contactor will energize. The outdoor air damper will remain at 0% for 30 seconds. It will then move to the 10% position for another 30 seconds. This will be repeated at every 10% increment for 30 seconds until the damper reaches 100% open. Close DIP switch no. 4 during the 30 seconds immediately after the desired outdoor air minimum damper position. The 30-second time period is to allow time where DIP switch no. 4 can be closed. The default value of the minimum outdoor air damper position is 20%. If the desired minimum position is 30%, allow the damper position to go to 10% for 30 seconds, then 20% for 30 seconds, and when it reaches 30% close DIP switch no. 4 during the 30-second period following the 30% position.

The minimum outdoor air damper position is now set. Close DIP switch no. 6.

B. Economizer Settings

Accessory Enthalpy Control (Fig. 26)

The control (HH57AC077) is mounted in the economizer hood. See Fig. 17. The enthalpy setting adjustment is on the enthalpy control. For maximum benefit of outdoor air, set enthalpy sensor control to A. See Fig. 27 and 28.

Enthalpy Control Installation

The outdoor air enthalpy control is installed on the inside panel of the outdoor air hood. The enthalpy control should be mounted when the outdoor air hoods are assembled. To install the control, perform the following procedure:

1. Turn off all power. Ensure disconnect is locked out.
2. Remove the economizer inlet filters from the bottom of the right hand economizer hood. See Fig. 29.

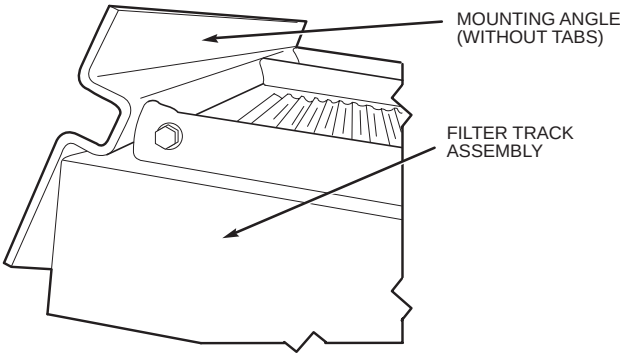


Fig. 23 — Mounting Angle (Without Tabs) Attached to Filter Track Assembly

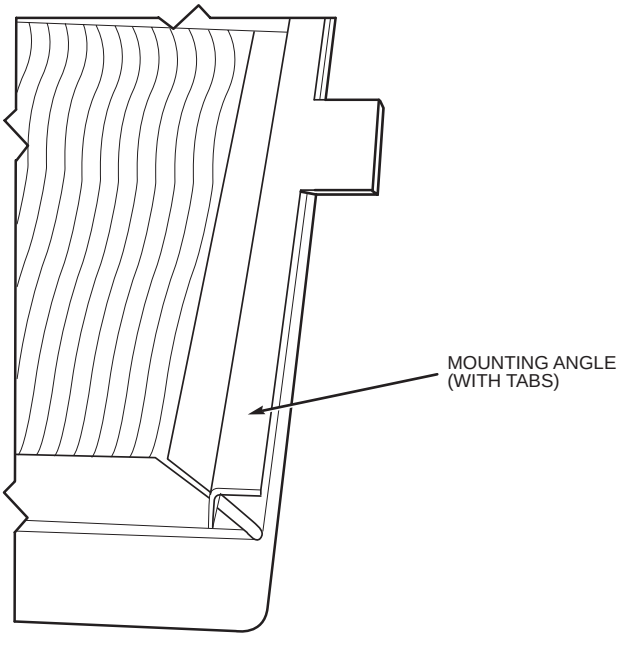


Fig. 24 — Mounting Angle (With Tabs) Attached to Filter Track Assembly

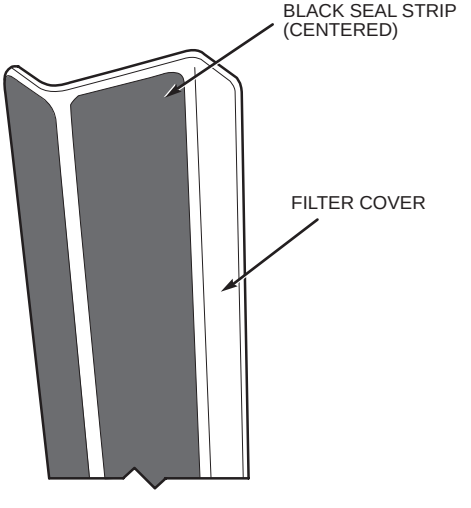
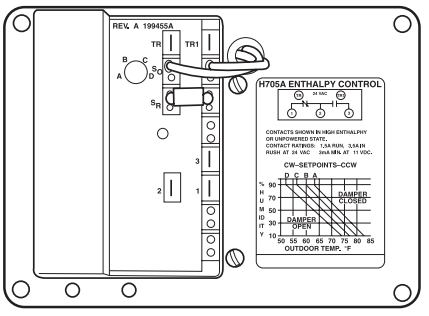
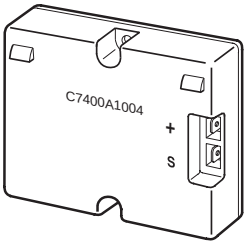


Fig. 25 — Attaching Seal Strip to Filter Cover



HH57AC077

ENTHALPY CONTROL



HH57AC078

ENTHALPY SENSOR (USED WITH ENTHALPY CONTROL FOR DIFFERENTIAL ENTHALPY OPERATION)

Fig. 26 — Enthalpy Control and Sensor

3. Mount the outdoor air enthalpy sensor inside the right economizer hood on the right side panel of the hood, adjacent to the outdoor-air thermistor.
4. Locate the red, violet, and brown wires near the outdoor air thermistor. Remove the splice from the red and violet wires. Remove the cap from the brown wire.
5. Install a ¼-in. push on terminal (field-supplied) on the violet and brown wires.
6. Connect a ¼-in. push on terminal (field-provided) to one end of a 18-gage, 6-in. jumper wire (field-provided). Connect the other end to the red wire and attach a ¼-in. push on connector (field-provided).
7. Connect the red wire with the jumper to terminal TR1. Connect the jumper to terminal 2. Connect the brown wire to terminal TR. Connect the violet wire to terminal 3. All connections are on the enthalpy control.
8. Replace the economizer filters.
9. Return power to unit.

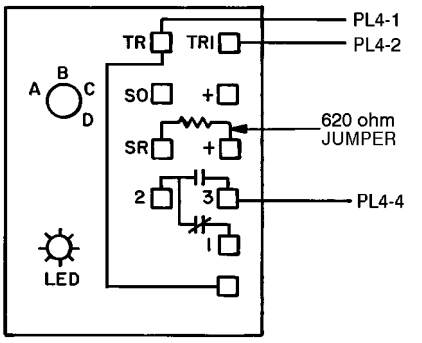
Accessory Differential Enthalpy Control (Fig. 26)

The control (HH57AC077), in conjunction with the accessory enthalpy sensor (HH57AC078), controls economizer operation according to the differential enthalpy. The control is mounted in the economizer hood. The sensor is mounted in the return duct (580G) or the return air plenum (580H).

Differential Enthalpy Sensor Installation

To install the control, perform the following procedure:

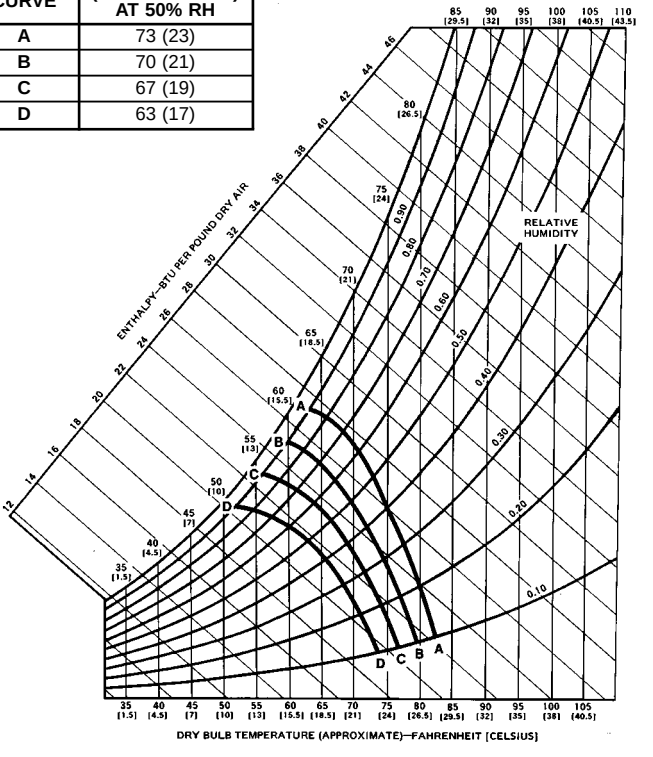
1. Turn off all power. Ensure disconnect is locked out.
2. Remove the economizer inlet filters from the bottom of the right hand economizer hood.
3. Remove the factory-installed, 620-ohm jumper between terminals SR and + on the enthalpy control located inside the outdoor air hood.
4. Connect the violet wire from the enthalpy sensor kit to the + terminal on the enthalpy control. Connect the blue wire from the enthalpy sensor kit to the SR terminal on the terminal control.



NOTE: Switches shown in high enthalpy state. Terminals 2 and 3 close on enthalpy decrease.

Fig. 27 — Wire Connections for Solid-State Enthalpy Control (HH57AC077)

CONTROL CURVE	CONTROL POINT (APPROX. DEG.) AT 50% RH
A	73 (23)
B	70 (21)
C	67 (19)
D	63 (17)



RH — Relative Humidity

Fig. 28 — Psychrometric Chart for Enthalpy Control

5. Turn the enthalpy control set point potentiometer clockwise past the "D" setting on the enthalpy control to configure the control to operate on differential enthalpy.
6. Remove the return-air enthalpy sensor from the accessory package. Using the screws provided, mount the sensor inside the return duct near the unit. Do not locate the control too far from the unit, or the wires will not reach from the sensor to the control. On 580H units, the enthalpy sensor can be installed in the return air section of the unit, under the return air dampers.
7. Route the wires from the enthalpy sensor to the return air enthalpy control through the holes on the inside of the hinged filter access panel. The holes are blocked by plug buttons which should be removed.

8. Use field-supplied wire ties to attach the violet wire to the + terminal and the blue wire to the SR terminal.
9. Replace economizer filters.
10. Return power to unit.

Disable Economizer

For applications where the economizer will not be used (areas of high humidity), the economizer should be disabled. To disable the economizer, perform the following:

1. Turn off power. Lock out disconnect.
2. Locate the OAT (outdoor air thermistor) in the right hand outdoor air damper area.
3. Locate the splice connecting the violet wire coming from T24 on the base module board to the red wire coming from T29 on the base module board. Remove the wire nut and break the red to violet wire splice.
4. Cap off both wires. When the connection is broken, the base module is fooled into thinking that the enthalpy is not acceptable and economizer operation is disabled.

NOTE: Economizer operation can also be disabled by disconnecting the OAT. This is not recommended due to the fact that Unoccupied Free Cooling, IAQ Purge, and Low Ambient Fan Cycle Control are also disabled. An OAT failure alarm will also be issued.

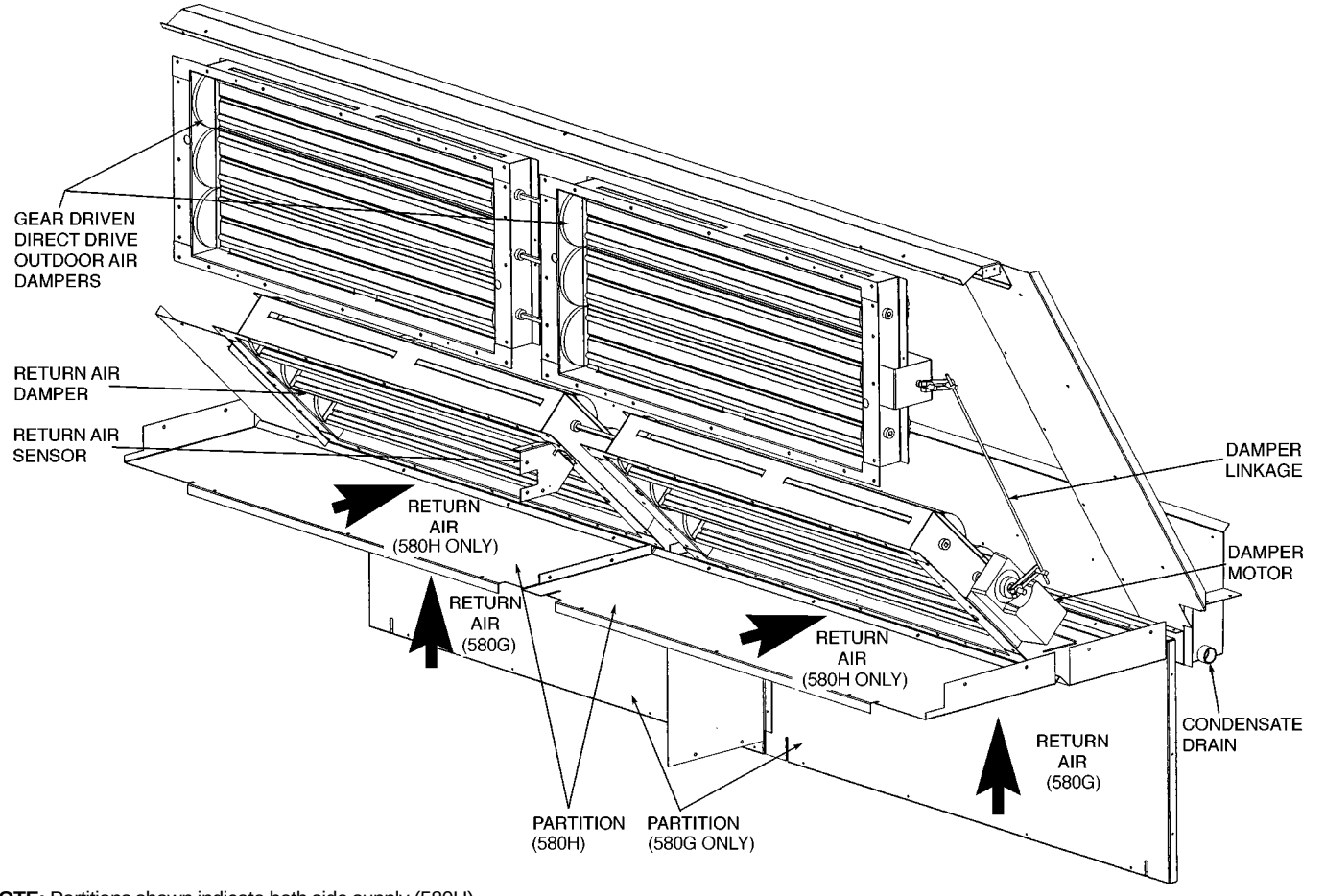
X. POWER EXHAUST/BAROMETRIC RELIEF DAMPER HOOD

All electrical connections have been made and adjusted at the factory. The power exhaust blowers and barometric relief dampers are shipped assembled and tilted back into the unit for shipping. Brackets and extra screws are shipped in shrink wrap around the dampers. If ordered, each unit will have 4 power exhaust blowers and motors or 4 barometric relief dampers.

1. Remove 9 screws holding each damper assembly in place. See Fig. 30. Each damper assembly is secured with 3 screws on each side and 3 screws along the bottom. Save screws.
2. Pivot each damper assembly outward until edges of damper assembly rest against inside wall of unit.

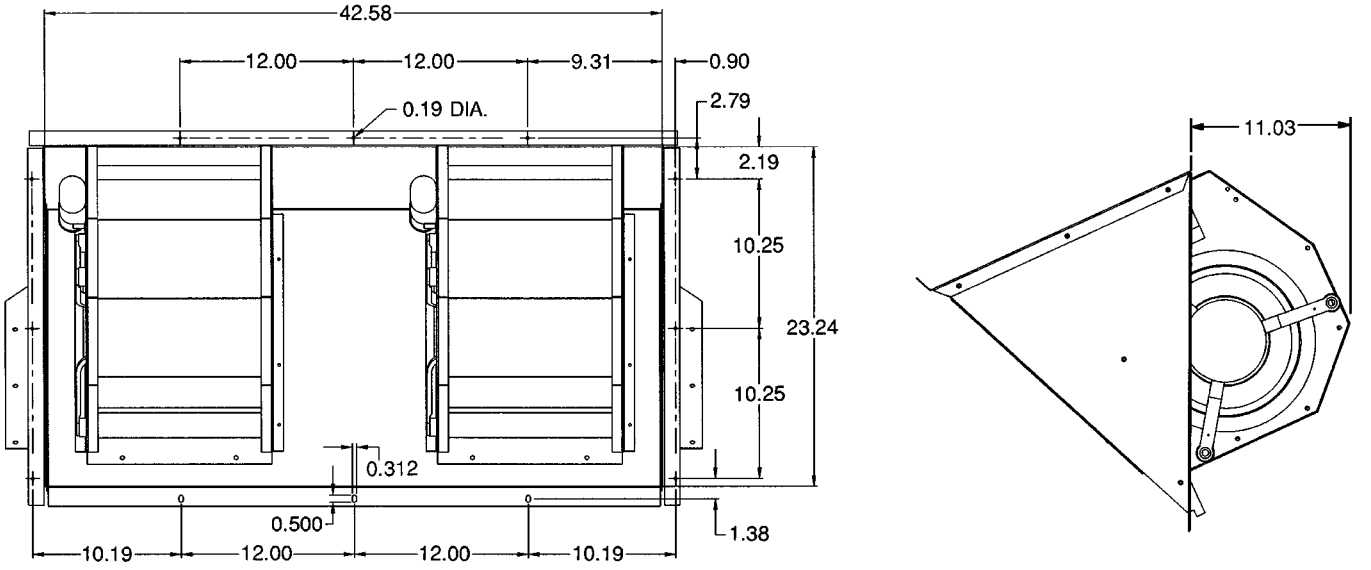
⚠ **CAUTION:** Be careful when tilting blower assembly. Hoods and blowers are heavy and can cause injury if dropped.

3. Secure each damper assembly to unit with 6 screws across top (3 screws provided) and bottom (3 screws from Step 1) of damper.
4. With screws saved from Step 1, install brackets on each side of damper assembly.
5. Remove tape from damper blades.



NOTE: Partitions shown indicate both side supply (580H) and vertical supply (580G) units.

Fig. 29 — Economizer Details



NOTES:
1. Unless otherwise specified, all dimensions are to outside of part.
2. Dimensions are in inches.

Fig. 30 — Barometric Relief Damper and Power Exhaust Mounting Details

XI. ACCESSORIES

After all the factory-installed options have been adjusted, install all field-installed accessories. Refer to the accessory installation instructions included with each accessory.

A. Motormaster® III Control Installation

Install Field-Fabricated Wind Baffles

Wind baffles must be field-fabricated for all units to ensure proper cooling cycle operation at low-ambient temperatures. See Fig. 31 for baffle details. Use 20-gage, galvanized sheet metal, or similar corrosion-resistant metal for baffles. Use field-supplied screws to attach baffles to unit. Screws should be ¼-in. diameter and ⅝-in. long. Holes for wind baffles are prepunched in the unit sheet metal.

⚠ **CAUTION:** To avoid damage to the refrigerant coils and electrical components, use recommended screw sizes only.

The wind baffles attach to flanges formed on the outer sheet metal of the unit where the condenser coil tube sheets attach.

Install Motormaster III Controls

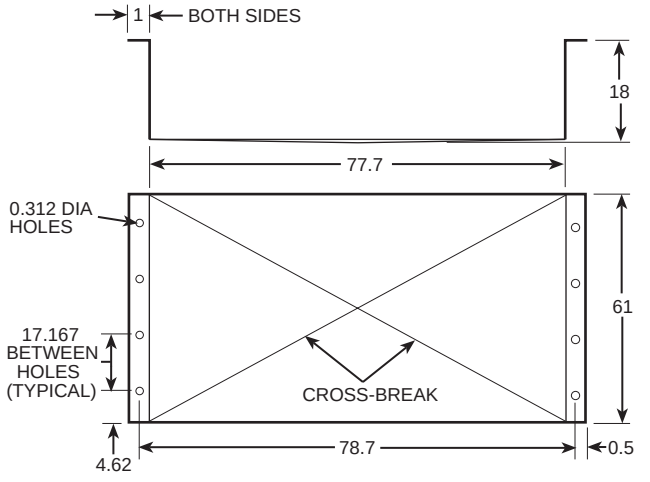
Only one Motormaster III control is required per unit.

Motor — The circuit no. 1 (lead compressor) outdoor-fan motor (OFM) will need to be changed out in the field to accommodate the Motormaster III accessory. The replacement motor part no. is HD52AK652.

The no. 1 compressor is located at the left side of the unit looking from the compressor end.

Sensor — Install the sensor for thermistor input control in the location shown in Fig. 32. Connect sensor leads to the violet and grey control signal leads on the Motormaster III control.

Signal Selection Switch — Remove the cover of the Motormaster III control. Set the switch to accept the thermistor sensor input signal. Set the frequency to match the unit power supply (60 Hz).



NOTE: All dimensions are in inches. Material: 20 gage galvanized steel or other non-corrosive material.

Fig. 31 — Motormaster III Baffle Details

Motormaster III Control — The recommended mounting location is in the indoor fan section, mounted on the panel that separates the indoor and outdoor sections.

Electrical Connections

⚠ **WARNING:** To avoid possibility of electrical shock and personal injury, turn off all power to unit before making electrical connections.

When replacing the OFM, reconnect the black, yellow, and blue wires from the outdoor fan contactor to the black, yellow, and blue wires of the Motormaster III control. Run new wires from the red, orange, and brown wires to the leads of the new OFM. Connect the green wire from the control to ground.

NOTE: On all 575-v units, 2 transformers (part no. HT01AH851) must be used for each Motormaster III control to lower the supply voltage to the control to 460-v. Transformers can be mounted anywhere outside the control box.

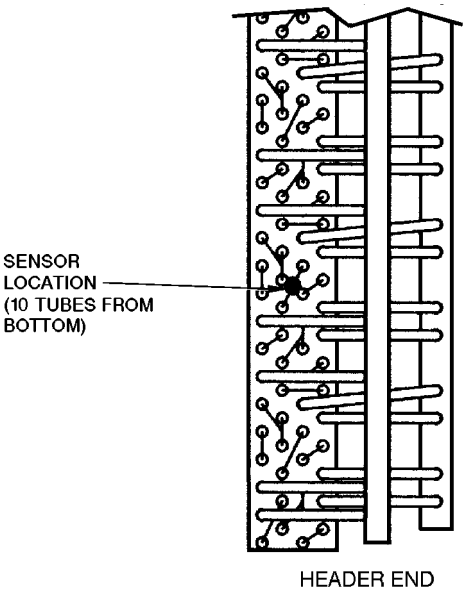


Fig. 32 — Low Ambient Kit Sensor Location

PRE-START-UP

⚠ **WARNING:** Failure to observe the following warnings could result in serious personal injury:

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources have been disconnected.
4. Remove and reclaim refrigerant from system before touching or disturbing anything inside terminal box if refrigerant leak is suspected around compressor terminals.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to unit.
   b. Remove and reclaim refrigerant from system.
   c. Cut component-connecting tubing with tubing cutter and remove component from unit.
   d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch, or liquid-soap solution.
   c. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that condenser-fan blades are correctly positioned in fan orifices. *Blades should clear fan motor and fan orifice ring.*
   b. Make sure that return-air filters and outdoor-air inlet screens are in place.
   c. Make sure that the condensate trap is filled with water to ensure proper drainage.
   d. Make sure that all tools and miscellaneous loose parts have been removed.
5. Loosen the compressor holddown bolts until sideways movement of the washer under each holddown bolt can be obtained. Do not loosen completely as bolts are self-locking and will maintain adjustment. Open compressor valves.
6. Make sure refrigerant service port caps are tight. Each refrigerant system has one suction port located in the top of the compressor motor casing. All units also have one service port on the liquid line valve and one on the compressor discharge valve.
7. Crankcase heaters are energized as long as there is power to the unit, except when the compressors are operating.

IMPORTANT: Unit power must be on for 24 hours prior to start-up. Otherwise, damage to compressor may result.

8. Ensure that the suction, discharge, and liquid line service valves are open. Damage to the compressor could result if they are left closed.
9. Check Direct Digital Controls DIP (dual-in-line package) switch configuration. The Direct Digital Control (DDC) board must be configured for each application. The DDC board is configured through the DIP switches located on the board. There are 8 DIP switches which configure 8 different applications of the DDC. See Table 4. DIP switch 1 is on the left of the block. DIP switch 8 is on the right of the block. To open a DIP switch, push the switch up with suitable tool (small-blade screwdriver). To close a DIP switch, push the switch down. Factory settings are shown in Table 5.

   The DIP switch configurations for the unit control software are as follows:

   - DIP switch 1 should be set to closed (CV operation)
   - DIP switch 2 should be set to closed (thermostat)
   - DIP switch 3 is used to enable expansion board operation
   - DIP switch 4 is used to field test the unit
   - DIP switch 5 is used to specify the type of power exhaust

Table 4 — DIP Switch Configuration

SETTING	1	2	3	4	5	6	7	8
OPEN	—	—	Expansion Board Operation	Field Test ON	Modulated Power Exhaust	Time Guard® Override ON IN CONJUNCTION WITH FIELD TEST — Set Minimum Damper Position	Gas Heat	Heat Pump Operation
CLOSED	CV	Thermostat Used	Base Control Board Only	Field Test OFF	CV Power Exhaust	Time Guard Override OFF	Electric Heat	Air Conditioner Operation

LEGEND

CV — Constant Volume

NOTES:
1. The OPEN side of the DIP switch is marked "OPEN." When the rocker switch is on the "OPEN" side of the switch, the switch is open.
2. When the unit is being field-tested (DIP switch 4 to OPEN), the function of DIP switch 6 changes and it is used to set the minimum damper position.

Table 5 — DIP Switch Factory Settings

UNIT	1	2	3	4	5	6	7	8
580G,H	Closed	Closed	Closed	Closed	Closed	Closed	Open	Closed

- DIP switch 6 configures the Time Guard override and, when used with the field test function, sets the minimum damper position
- DIP switch 7 configures the unit for gas heat or electric heat
- DIP switch 8 configures the unit for heat pump or air conditioner operation

10. Adjust economizer. Check that outdoor-air damper is closed and return-air damper is open.

IMPORTANT: Unit power must be on for 24 hours prior to start-up. Otherwise, damage to compressor may result.

11. The optional non-modulating power exhaust is a two-stage design where the operation of the exhaust fans is linked to economizer position. When the supply fan is running and the economizer is 25% open, the base module closes contacts, activating 2 exhaust fans. When the economizer position reaches 75% open, the base module activates the other 2 exhaust fans. The fans will turn off when the economizer closes below the same points.

START-UP

I. COOLING SECTION START-UP AND ADJUSTMENTS

⚠ **CAUTION:** Complete the required procedures given in the Pre-Start-Up section on page 20 before starting the unit.

Do not jumper any safety devices when operating the unit.

Do not operate the compressor when the outdoor temperature is below 40 F (unless accessory low ambient kit is installed).

Do not rapid-cycle the compressor. Allow 5 minutes between "on" cycles to prevent compressor damage.

A. Checking Cooling Control Operation

Start and check the unit for proper cooling control operation as follows:

Place SYSTEM switch in COOL position and FAN switch in AUTO. position. Set cooling control below room temperature. Observe that compressor, condenser fan motor, and evaporator blower motors start. Observe that cooling cycle shuts down when control setting is satisfied.

B. Cooling Sequence of Operation

On power up, the control module will activate the initialization software. The initialization software reads DIP switch no. 1 to determine it is in the closed position. Next, DIP switch no. 2 is read to determine it is closed for thermostat operation. The initialization sequence clears all alarms and alerts; re-maps the input/output database for operation; sets maximum heat stages to 2; and sets maximum cool stages to 3. Power up takes a random 1 to 63 seconds plus 5 minutes.

The TSTAT function performs a thermostat based control by monitoring Y1, Y2, W1, W2 and G inputs. These functions control stages: cool1, cool2, heat1, heat2 and the indoor fan, respectively.

The control module will operate economizer and run diagnostics to monitor alarms at all times.

If the thermostat energizes the G input, the control module will turn on the indoor fan and open the economizer dampers to minimum position. If thermostats are used to deenergize the G input, the control module will turn off the indoor fan and close the economizer dampers.

When cooling, G must be energized before cooling can operate. The control module determines if outdoor conditions are suitable for economizer cooling. For the economizer to function for outside air cooling: the enthalpy must be below the enthalpy set point; the outdoor-air temperature must be equal to or less than 65 F; the SAT (supply-air temperature) thermistor must not be in alarm; and the outdoor air reading is available. When these conditions are satisfied, the control module will use economizer as the first stage of cooling.

When Y1 input is energized, the economizer will be modulated to maintain SAT at the set point temperature. The default is 55 F. When SAT is above the set point, the economizer will be 100% open. When SAT is below the set point, the economizer will modulate between minimum and 100% open position. When Y2 is energized, the control module will turn on compressor 1 and continue to modulate the economizer as described above. If the Y2 remains energized and the SAT reading remains above the set point for 15 minutes,

compressor 2 will turn on. If Y2 is deenergized at any time, only the last stage of compression that was energized will be turned off. If outdoor conditions are not suitable for economizer cooling, the economizer will go to minimum position and cycle compressors 1 and 2 based on demand from Y1 and Y2 respectively. The compressors will be locked out when the SAT temperature is too low (less than 40 F for compressor 1 and less than 45 F for compressor 2.) After a compressor is locked out, it can restart after normal time-guard period.

The compressor time delay function maintains a minimum off time of 5 minutes, a minimum on time of 10 seconds, and a minimum delay before starting the second compressor of 10 seconds.

When heating, the heat stages respond to the demand from W1 and W2 of the thermostat input. Heating and cooling will be mutually locked-out on demand on a first call basis. The heating and the cooling functions cannot operate simultaneously.

C. Cooling Capacity Control

The cooling capacity staging is shown in Table 6.

Table 6 — Cooling Capacity Staging Table, Units with 2 Compressors

STAGES	0	1 ECONOMIZER	2	3
Compressor 1	Off	Off	On	On
Compressor 2	Off	Off	Off	On

NOTE: On units which require additional unloading, add suction pressure unloaders to compressor no. 1 only.

II. HEATING SECTION START-UP AND ADJUSTMENTS

⚠ **CAUTION:** Complete the required procedures given in the Pre-Start-Up section on page 20 before starting unit. Do not jumper any safety devices when operating the unit.

Verify gas pressures before turning on heat as follows:

a. Turn off manual gas stop.

b. Connect pressure gage to supply gas tap (See Fig. 10 on page 8).

c. Connect pressure gage to manifold pressure tap on gas valve.

d. Supply gas pressure must not exceed 13.5 in. wg. Check pressure.

e. Turn on manual gas stop and set thermostat to HEAT position. After the unit has run for several minutes, verify that incoming pressure is 5.0 in. wg or greater, and that the manifold pressure is 3.5 in. wg. If manifold pressure must be adjusted, refer to Gas Valve Adjustment section on page 25.

A. Checking Heating Control Operation

Start and check the unit for proper heating control operation as follows:

1. Turn on manual gas stop.
2. Set thermostat setting to HEAT position.
3. The evaporator fan and first-stage heat will start immediately. If unit is equipped with 2 heaters, second-stage heat will energize upon a call for additional heat. Check for heating effect at supply diffusers.
4. The evaporator fan and heaters will cycle off with no delay after thermostat temperature is satisfied.

B. Gas Heating

The gas heat units incorporate two separate systems to provide gas heat. Each system incorporates its own induced draft motor, Integrated Gas Control (IGC) board, 2-stage gas valve, manifold, etc. The systems are operated in parallel, for example, when there is a call for first stage heat, both induced draft motors operate, both gas valves are energized and both IGC boards initiate spark.

All of the gas heating control is performed through the IGC boards. The base module board serves only to initiate and terminate heating operation.

The base module board is powered by 24 vac. When the thermostat or room sensor calls for heating, power is sent from the base module board to W on each of the IGC boards. A light-emitting diode (LED) on the IGC board will be on during normal operation. A check is made to ensure that the rollout switches and limit switches are closed and the induced draft motors are not running. The induced-draft motors are then energized and when speed is proven with the hall effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds.

When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the hall effect sensor as well as the flame sensor. If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs, the indoor-fan motor will be energized and the outdoor-air dampers will open to their minimum position. If for some reason the overtemperature limit opens prior to the start of the indoor fan blower, on the next attempt, the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

When additional heat is required, W2 closes and initiates power to the second stage of the main gas valves. When the thermostat is satisfied, W1 and W2 open and the gas valves close interrupting the flow of gas to the main burners. If the call for W1 lasted less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is controlled through a room thermostat set for fan auto., the indoor-fan motor will continue to operate for an additional 45 seconds then stop and the outdoor-air dampers will close. If the over-temperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

C. Power Exhaust Operation

The optional power exhaust packages are factory- or field-installed with vertical units and optionally installed in the return air ductwork for horizontal applications. The standard and the modulating power exhaust (used with non-modulatng to modulating conversion package) are the two packages offered. The modulating power exhaust package is equipped with a field-adjustable static pressure controller to stage up to 4 power exhaust stages which will maintain a building static pressure. The blue controller located in the control box below the control board can be adjusted, by removing the covers and adjusting the set point dial to the desired building pressure. The blue controller monitors the 4 individual sequencers which activate the 4 individual power exhaust motors. The standard power exhaust package

controls up to 2 stages of power exhaust to maintain building pressure. The power exhaust package can be configured to deliver positive or negative building pressure. These power exhaust stages are staged according to a percentage of the economizer dampers position. Default values are 25% for Stage 1 and 75% for Stage 2.

D. Smoke Control Modes

The 580G,H units with an optional expansion board perform fire and smoke control modes. The expansion board provides 4 modes which can be used to control smoke within the conditioned area. The modes of operation are fire shutdown, pressurization, evacuation, and smoke purge. See Table 7.

E. Smoke Detector

A smoke detector can be used to initiate fire shutdown. This can be accomplished by a set of normally closed pilot relay contacts which will interrupt power from the 24-v transformer, secondary "B" terminal to the control circuit breaker (CB4). See Fig. 33. The wire that connects these two points is white and labeled "W78."

NOTE: On standard gas models, the indoor fan will continue to run 45 seconds after the call for heat has been terminated. If fire shutdown is initiated the fan will stop immediately. No 45-second delay will occur.

The smoke detector may be mounted in the return air duct or the supply duct.

F. Indoor Air Quality Control

The accessory expansion board and accessory IAQ sensor are required for IAQ control. The IAQ sensors operate with a 4 to 20 mA signal. The 4 to 20 mA signal is connected to T11 (+) and T12 (−) on the expansion board for the IAQ sensor, and T13 (+) and T14 (−) on the expansion board for the OAQ (Outdoor Air Quality) sensor. The sensor is field-mounted and wired to the expansion board installed in the unit main control box. The IAQ sensor must be powered by a field-supplied 24-v power supply (ungrounded). Do not use the unit 24-v power supply to power the sensor.

Once installed, the sensor must be enabled. The sensor is configured with default values which may be changed through network access software. To work properly, the IAQ sensor high and low reference points for the sensor that is used must match the configured values. The expansion board reacts to a 4 to 20 mA signal from the IAQ sensor. The low reference (4 mA output) must be configured to the minimum IAQ sensor reading. The high reference (20 mA output) must be configured to the maximum IAQ sensor reading.

The IAQ sensor can be configured to either low or high priority. The priority value can be changed by the user. The default is low.

Low Priority

When the priority is set to low, the initial control is to the IAQ set point, but the outside air damper position will change to its minimum position when the space temperature is greater than the occupied cooling set point plus 2° F or when the space temperature is less than the occupied heating set point minus 2° F. The damper will also change to minimum position when the outdoor air quality is greater than the outdoor air quality set point (ppm).

High Priority

When the priority is set to high, the IAQ set point controls the outside air damper exclusively, with no regard to comfort conditioning.

G. Time Guard® Circuit

The Time Guard function (built into the rooftop control board) maintains a minimum off time of 5 minutes, a minimum on time of 10 seconds, and a 10-second delay between compressor starts.

H. Crankcase Heater

Unit main power supply must remain on to provide crankcase heater operation. The crankcase heater in each compressor keeps oil free of refrigerant while compressor is off.

Table 7 — Smoke Control Modes

DEVICE	PRESSURIZATION	SMOKE PURGE	EVACUATION	FIRE SHUTDOWN
Economizer	100%	100%	100%	0%
Indoor Fan	ON	ON	OFF	OFF
Power Exhaust (all outputs)	OFF	ON	ON	OFF
Heat Stages	OFF	OFF	OFF	OFF

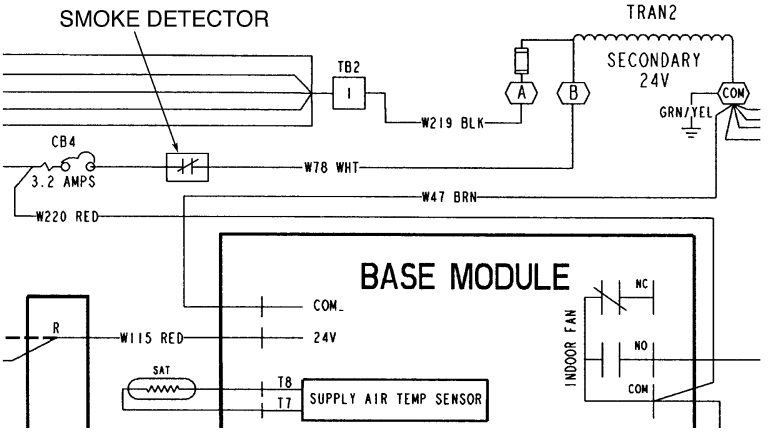


Fig. 33 — Field-Supplied Smoke Detector Wiring

I. Head Pressure Control

Each unit has a fan cycling, outdoor thermostat to shut off the outdoor-fan motor(s) at 55 F. The head pressure control permits unit to operate with correct condensing temperatures down to 35 F outdoor-air temperature.

J. Motormaster® III Control

The Motormaster III Solid-State Head Pressure Control is a field-installed accessory fan speed control device actuated by a temperature sensor. It is specifically designed for use on Bryant equipment and controls the condenser-fan motor speed in response to the saturated condensing temperature. For outdoor temperatures down to −20 F, it maintains condensing temperature at 100 F. Refer to the accessory Motormaster installation instructions for more information.

III. FIELD TEST OPERATION

The field test program is initiated by moving up DIP switch no. 4 to the "On" position. The outdoor-air damper will close. The control allows 90 seconds for the damper to close in case it was in the full open position. Next, the indoor-fan contactor will be energized, and the outside-air damper will begin to open to its default value of 20% and stay at that position for a short period of time. The outdoor-air damper will then open to its full open position and stay at that position for a short period of time. The outdoor-air damper will then close.

If the unit is equipped with power exhaust, stage 1 will be energized for 5 seconds. If the unit is configured for stage 2 of power exhaust, stage 2 will be energized for 5 seconds after the first stage is deenergized.

The first stage of heat will be energized for 30 seconds, after which the second stage heat will be energized for an additional 30 seconds. Heat is then deenergized.

The last step is the Cooling mode. Outdoor-fan contactor no. 1 is energized. This is followed by each stage of cooling energized with a 10-second delay between stages. After this is complete, outdoor-fan contactor no. 2 is energized for 10 seconds.

The compressors will now deenergize, followed by the outdoor-fan contactors and indoor-fan contactors. If the unit is equipped with the Integrated Gas Control (IGC) board the indoor fan will operate for an additional 30 seconds after deenergizing the circuit.

Setting of the outdoor-air damper position is performed in conjunction with a shortened version of the field test. Open DIP switch no. 4 and then no. 6.

The outdoor-air damper will close. The control allows 90 seconds for the damper to close in case it is in the full open position. Next, the indoor-fan contactor will energize. The outdoor-air damper will remain at 0% for 30 seconds. It will then move to the 10% position for another 30 seconds. This will be repeated at every 10% increment for 30 seconds until the damper reaches 100% open. Close DIP switch no. 4 during the 30 seconds immediately after the desired outdoor-air minimum damper position. The 30-second time period is to allow time where DIP switch no. 4 can be closed. The default value of the minimum outdoor-air damper position is 20%. If the desired minimum position is 30%, allow the damper position to go to 10% for 30 seconds, then 20% for 30 seconds, and when it reaches 30% close DIP switch no. 4 during the 30-second period following the 30% position.

The minimum outdoor-air damper position is now set. Close DIP switch no. 6.

IV. INDOOR AIRFLOW AND AIRFLOW ADJUSTMENTS

⚠ **CAUTION:** For cooling operation, the recommended airflow is 300 to 450 cfm per each 12,000 Btuh of rated cooling capacity. For heating operation, the airflow must produce a temperature rise that falls within the range stamped on the unit rating plate.

A. Evaporator Fan Performance Adjustment

Be sure evaporator fans rotate in the proper direction. See Tables 8 and 9 for Fan Performance data. See Table 10 for Motor Limitation data. See Table 11 for air quantity limits.

IMPORTANT: Check to ensure that the unit drive matches the duct static pressure using Table 8.

Fan motor pulleys are factory set for speed shown in Table 1. To change fan speeds, change pulleys.

To align fan and motor pulleys (Fig. 34):

1. Shut off unit power supply.
2. Loosen fan shaft pulley bushing.
3. Slide fan pulley along fan shaft.
4. Make angular alignment by loosening motor from mounting plate.
5. Retighten pulley.

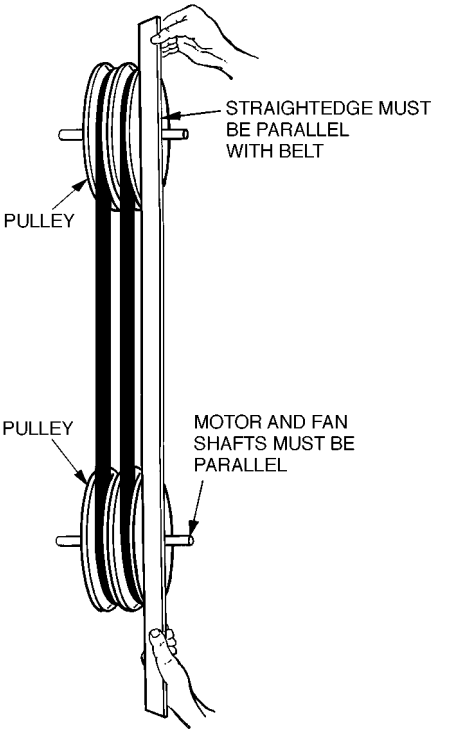


Fig. 34 — Evaporator-Fan Pulley Alignment and Adjustment

B. Belt Tension Adjustment

To adjust belt tension:

1. Remove power to unit.
2. Remove motor mount nuts and bolts.
3. Loosen fan motor nuts. See Fig. 35.

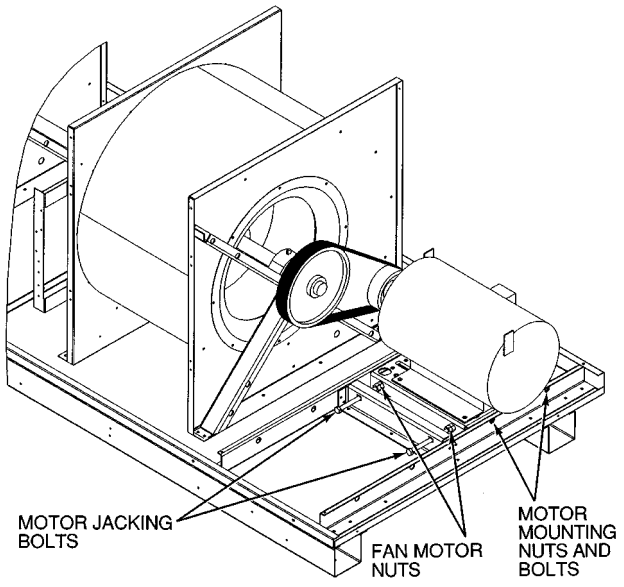


Fig. 35 — Belt Tension Adjustment

4. Turn motor jacking bolts to move motor mounting plate left or right for proper belt tension. Refer to Table 2 for proper belt tension.
5. Tighten nuts.
6. Adjust bolts and nut on mounting plate to secure motor in fixed position. Recheck belt tension after 24 hours of operation. Adjust as necessary.

C. Condenser-Fan Adjustment

1. Shut off unit power supply.
2. Remove fan guard.
3. Loosen fan hub setscrews.
4. Adjust fan height on shaft using a straightedge placed across venturi and measure per Fig. 36.
5. Tighten setscrews and replace fan guard.
6. Turn on unit power.

V. GAS VALVE ADJUSTMENT

A. Natural Gas

The gas valve opens and closes in response to the thermostat or limit control.

When power is supplied to valve terminals 3 and 4, the pilot valve opens to the preset position. When power is supplied to terminals 1 and 2, the main valve opens to its preset position.

The regular factory setting is stamped on the valve body (3.5 in. wg).

To adjust regulator:

1. Set thermostat at setting for no call for heat.
2. Turn field-supplied main gas valve to OFF position.
3. Remove ⅛-in. pipe plug from manifold. Install a water manometer pressure-measuring device.
4. Set main gas valve to ON position.
5. Set thermostat at setting to call for heat.
6. Remove screw cap covering regulator adjustment screw (See Fig. 37).
7. Turn adjustment screw clockwise to increase pressure or counterclockwise to decrease pressure.
8. Once desired pressure is established, set thermostat setting for no call for heat, turn off main gas valve, remove pressure-measuring device and replace ⅛-in. pipe plug and screw cap.

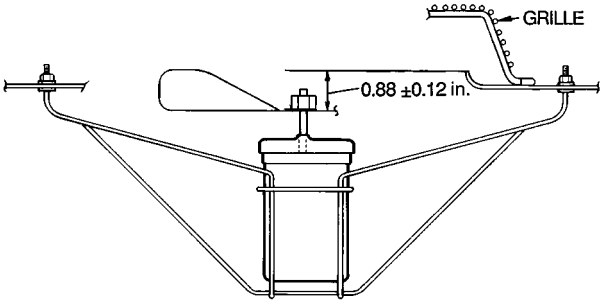


Fig. 36 — Condenser-Fan Adjustment

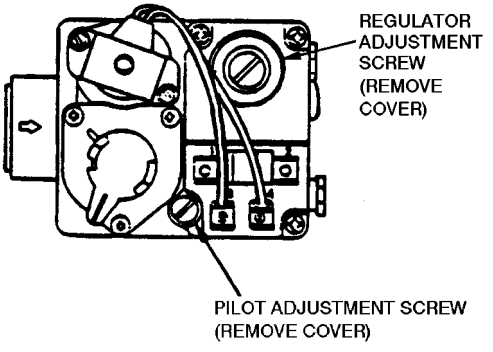


Fig. 37 — Gas Valve

Table 8 — Fan Performance, 580G240-360 — Vertical Discharge Units

For 580H units, reduce net available external static pressure by 0.3 in. wg.

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	340	0.83	416	1.17	480	1.52	537	1.90	588	2.29	635	2.69	679	3.11	720	3.53
5,000	384	1.25	453	1.61	513	1.99	566	2.39	615	2.79	660	3.21	703	3.64	742	4.08
6,000	432	1.79	495	2.19	550	2.59	600	3.01	647	3.43	690	3.87	730	4.31	769	4.77
7,000	483	2.48	540	2.91	591	3.33	638	3.77	682	4.22	723	4.67	762	5.14	799	5.61
8,000	536	3.33	588	3.78	635	4.23	679	4.69	720	5.16	759	5.64	797	6.12	832	6.61
8,250	549	3.57	600	4.02	646	4.48	690	4.95	730	5.42	769	5.90	806	6.39	841	6.88
9,000	590	4.34	637	4.82	681	5.30	722	5.78	762	6.27	799	6.77	834	7.27	868	7.77
10,000	645	5.54	689	6.04	729	6.54	768	7.04	805	7.56	840	8.07	874	8.59	906	9.12
11,000	701	6.92	741	7.44	779	7.96	816	8.49	850	9.03	884	9.56	916	10.10	947	10.65
12,000	757	8.49	795	9.04	830	9.59	865	10.14	898	10.69	929	11.25	960	11.81	990	12.37
12,500	786	9.36	822	9.92	856	10.47	890	11.03	922	11.60	953	12.16	983	12.73	1012	13.31
13,000	814	10.28	849	10.84	883	11.41	915	11.98	946	12.56	976	13.13	1006	13.71	1034	14.30
13,750	857	11.75	890	12.34	922	12.92	953	13.51	983	14.10	1012	14.69	1041	15.28	1068	15.88
14,000	871	12.27	904	12.86	936	13.45	966	14.05	996	14.64	1025	15.23	1053	15.83	1080	16.43
15,000	929	14.50	960	15.10	990	15.71	1019	16.33	1047	16.94	1074	17.55	1101	18.17	1127	18.79

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)															
	1.8		2.0		2.2		2.4		2.6		2.8		3.0		3.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	759	3.97	796	4.42	831	4.87	865	5.34	897	5.81	929	6.30	959	6.79	988	7.28
5,000	780	4.53	816	4.99	851	5.45	884	5.93	916	6.41	946	6.90	976	7.40	1005	7.91
6,000	805	5.23	840	5.70	874	6.18	906	6.67	937	7.16	968	7.66	997	8.17	1025	8.69
7,000	834	6.09	868	6.57	901	7.07	932	7.56	962	8.07	992	8.58	1020	9.10	1048	9.63
8,000	866	7.10	899	7.60	930	8.11	961	8.62	990	9.14	1019	9.67	1047	10.20	1074	10.74
8,250	874	7.38	907	7.89	938	8.40	968	8.92	998	9.44	1026	9.97	1054	10.50	1081	11.04
9,000	901	8.29	932	8.80	963	9.33	992	9.86	1021	10.39	1049	10.93	1076	11.48	1102	12.03
10,000	938	9.65	968	10.18	997	10.72	1026	11.27	1054	11.82	1081	12.37	1107	12.93	1133	13.49
11,000	977	11.19	1006	11.75	1035	12.30	1062	12.87	1089	13.43	1115	14.00	1141	14.57	1166	15.15
12,000	1019	12.94	1047	13.51	1074	14.08	1100	14.66	1126	15.24	1152	15.83	1177	16.42	1201	17.01
12,500	1040	13.88	1067	14.46	1094	15.05	1120	15.63	1146	16.22	1171	16.82	1195	17.41	—	—
13,000	1062	14.88	1089	15.47	1115	16.06	1140	16.66	1166	17.25	1190	17.86	—	—	—	—
13,750	1095	16.48	1121	17.08	1147	17.68	1172	18.29	1196	18.90	—	—	—	—	—	—
14,000	1106	17.04	1132	17.64	1157	18.25	1182	18.86	—	—	—	—	—	—	—	—
15,000	1152	19.41	1177	20.04	1200	20.66	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)					
	3.4		3.6		3.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
4,000	1017	7.79	1045	8.30	1072	8.82
5,000	1033	8.42	1061	8.94	1087	9.46
6,000	1053	9.21	1080	9.73	1106	10.27
7,000	1075	10.16	1102	10.69	1127	11.24
8,000	1100	11.28	1126	11.83	1151	12.38
8,250	1107	11.59	1133	12.14	1158	12.69
9,000	1128	12.58	1153	13.14	1178	13.70
10,000	1158	14.06	1183	14.63	—	—
11,000	1190	15.74	—	—	—	—
12,000	—	—	—	—	—	—
12,500	—	—	—	—	—	—
13,000	—	—	—	—	—	—
13,750	—	—	—	—	—	—
14,000	—	—	—	—	—	—
15,000	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. Fan performance is based on wet coils, economizer, roof curb, cabinet losses, and clean 2-in. filters.
2. Conversion — Bhp to watts:

$$\text{Watts} = \frac{\text{Bhp} \times 746}{\text{Motor efficiency}}$$

Table 9 — Fan Performance — Power Exhaust

580G,H240-360																		
Airflow (Cfm)	Low Speed						Medium Speed						High Speed					
	208 v			230, 460, 575 v			208 v			230, 460, 575 v			208 v			230, 460, 575 v		
	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts	ESP	Bhp	Watts
6,500	0.32	2.82	3160	0.70	2.98	3340	—	—	—	—	—	—	—	—	—	—	—	—
6,700	0.23	2.87	3220	0.63	3.03	3400	0.60	3.01	3380	0.82	3.23	3620	—	—	—	—	—	—
6,900	0.17	2.92	3270	0.59	3.09	3460	0.55	3.07	3440	0.78	3.28	3680	—	—	—	—	—	—
7,100	0.13	2.93	3290	0.56	3.11	3490	0.49	3.12	3500	0.73	3.34	3740	—	—	—	—	—	—
7,300	0.09	2.97	3330	0.53	3.15	3530	0.43	3.18	3560	0.68	3.39	3800	—	—	—	—	—	—
7,500	—	—	—	0.51	3.19	3580	0.39	3.24	3630	0.64	3.44	3860	—	—	—	—	—	—
7,700	—	—	—	0.48	3.23	3620	0.33	3.27	3670	0.59	3.48	3900	0.60	3.69	4140	0.73	3.98	4460
7,900	—	—	—	0.45	3.27	3670	0.27	3.32	3720	0.54	3.52	3950	0.56	3.74	4190	0.69	4.02	4510
8,100	—	—	—	0.40	3.33	3730	0.22	3.36	3770	0.49	3.57	4000	0.51	3.78	4240	0.65	4.07	4560
8,500	—	—	—	—	—	—	0.17	3.47	3890	0.40	3.67	4120	0.41	3.83	4290	0.56	4.12	4620
8,900	—	—	—	—	—	—	0.00	3.58	4010	0.30	3.77	4230	0.31	3.93	4410	0.47	4.23	4740
9,300	—	—	—	—	—	—	—	—	—	0.22	3.87	4340	0.20	4.07	4560	0.37	4.37	4900
9,700	—	—	—	—	—	—	—	—	—	0.16	3.95	4430	0.11	4.17	4670	0.30	4.47	5010
10,100	—	—	—	—	—	—	—	—	—	0.12	4.03	4520	0.04	4.25	4770	0.23	4.56	5110
10,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.17	4.66	5220
10,900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	4.75	5330
11,300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.07	4.80	5380
11,700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04	4.83	5420

LEGEND

Bhp — Brake Horsepower
ESP — External Static Pressure (in. wg)
Watts — Input Watts to Motor

Table 10 — Motor Limitations

STANDARD EFFICIENCY MOTORS						
Nominal Hp	Maximum Bhp	Maximum Amps			Maximum Watts	Motor Efficiency
		230	460	575		
5	5.9	14.6	—	—	5,030	87.5
	5.9	—	7.9	6.0	5,030	87.5
7.5	8.7	22.0	—	—	7,334	88.5
	9.5	—	12.0	10.0	8,008	88.5
10	10.2	28.0	—	—	8,502	89.5
	11.8	—	14.6	12.0	9,836	89.5
15	15.3	43.8	—	—	12,543	91.0
	18.0	—	21.9	19.0	14,756	91.0
20	22.4	62.0	—	—	18,363	91.0
	23.4	—	28.7	23.0	19,183	91.0

HIGH EFFICIENCY MOTORS					
Nominal Hp	Maximum Bhp	Maximum Amps		Maximum Watts	Motor Efficiency
		230	460		
5	5.9	15.8	—	4,918	89.5
	5.9	—	7.9	4,918	89.5
7.5	8.7	22.0	—	7,078	91.7
	9.5	—	12.0	7,728	91.7
10	10.2	28.0	—	8,298	91.7
	11.8	—	15.0	9,600	91.7
15	15.3	43.8	—	12,273	93.0
	18.0	—	21.9	14,439	93.0
20	22.4	58.2	—	17,853	93.6
	23.4	—	28.7	18,650	93.6

LEGEND

BHP — Brake Horsepower

NOTE: Extensive motor and electrical testing on the these units has ensured that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown on the Motor Limitations table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 11 — Air Quantity Limits

UNIT 580G,H	MINIMUM HEATING CFM	MINIMUM COOLING CFM	MAXIMUM CFM
240	6,000	6,000	10,000
300	7,500	7,500	12,500
324	8,250	8,250	13,750
360	9,000	9,000	15,000

VI. MAIN BURNERS

For all applications, main burners are factory set and should require no adjustment.

A. Main Burner Removal (Fig. 38)

1. Shut off (field-supplied) manual main gas valve.
2. Shut off power to unit.
3. Remove heating access panel.
4. Disconnect gas piping from gas valve inlet.
5. Remove wires from gas valve.
6. Remove wires from rollout switch.
7. Remove sensor wire and ignitor cable from IGC board.
8. Remove 2 screws securing manifold bracket to basepan.
9. Remove 4 screws that hold the burner support plate flange to the vestibule plate.
10. Lift burner assembly out of unit.

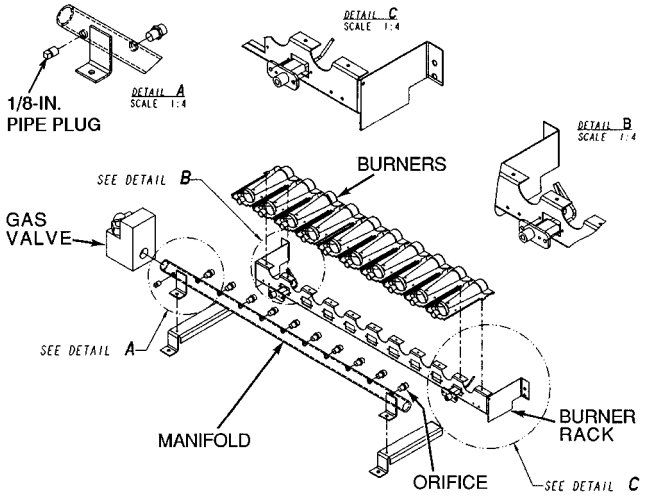


Fig. 38 — Main Burner Removal

VII. POWER EXHAUST OPERATION

The power exhaust packages are factory- or field-installed with vertical units and optionally installed in the return air ductwork for horizontal applications. The standard and the modulating power exhaust are the two packages offered. The modulating power exhaust package is equipped with a field-adjustable static pressure controller to stage up to 4 power exhausts stages which will maintain a building static pressure. The blue sequencer located in the control box below the control board can be adjusted, by removing the covers and adjusting the set point dial to the desired building pressure. The standard power exhaust package controls up to 2 stages of power exhaust to maintain building pressure. These power exhaust stages are staged according to a percentage of the economizer dampers position.

VIII. HEAD PRESSURE CONTROL

Each unit has a fan cycling, outdoor thermostat to shut off the outdoor-fan motor at 55 F. The head pressure control permits unit to operate with correct condensing temperatures down to 35 F outdoor-air temperature.

IX. LOW AMBIENT KIT

Low Ambient Kit is a fan speed control device actuated by a temperature sensor. The field-installed accessory is specifically designed for use on this equipment and controls the condenser-fan motor speed in response to the saturated condensing temperature. For outdoor temperatures down to −20 F, it maintains condensing temperature at 100 F.

CARE AND MAINTENANCE

To ensure continuing high performance, and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This combination heating/cooling unit should be inspected at least once each year by a qualified service person.

NOTE TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

⚠ **WARNING:** The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment other than those procedures recommended in the User's Manual. FAILURE TO HEED THIS WARNING COULD RESULT IN SERIOUS PERSONAL INJURY AND POSSIBLE DAMAGE TO THIS EQUIPMENT.

The minimum maintenance requirements for this equipment are as follows:

1. Inspect air filters each month. Clean or replace when necessary.
2. Inspect cooling coil, drain pan, and condensate drain each cooling season for cleanliness. Clean when necessary.
3. Inspect blower motor and wheel each heating and cooling season. Clean and lubricate (if required) when necessary.
4. Lubricate bearings every 6 months if fan runs continuously or annually if fan runs intermittently.
5. Check electrical connections for tightness and controls for proper operation each heating and cooling season. Service when necessary.
6. Check and inspect heating section before each heating season.
7. Check and clean vent screen if needed.

⚠ **WARNING:** Failure to follow these warnings could result in serious personal injury:

1. Turn off electrical power to the unit before performing any maintenance or service on the unit.
2. Use extreme caution when removing panels and parts. As with any mechanical equipment, personal injury can result from sharp edges, etc.
3. Never place anything combustible either on, or in contact with, the unit.
4. Should overheating occur, shut off the electrical supply.

SERVICE

⚠ **WARNING:** Before beginning any maintenance, be sure to turn off power at the main disconnect switch. TAG THE SWITCH WITH A SUITABLE WARNING LABEL.

All unit components can be reached through clearly labelled hinged access doors. These doors are not equipped with tie-backs, so if heavy duty servicing is needed, either remove them or prop them open to prevent accidental closure.

Each door is held closed with 3 latches. The latches are secured to the unit with a single ¼-in. - 20 x ½-in. long bolt. See Fig. 39.

To open, loosen the latch bolt using a 7/16-in. wrench. Pivot the latch so it is not in contact with the door. Open the door. To shut, reverse the above procedure.

NOTE: Disassembly of the top cover may be required under special service circumstances. It is very important that the orientation and position of the top cover be marked on the unit prior to disassembly. This will allow proper replacement of the top cover onto the unit and prevent rainwater from leaking into the unit.

IMPORTANT: After servicing is completed, make sure door is closed and relatched properly, and that the latches are tight. Failure to do so can result in water leakage into the evaporator section of the unit.

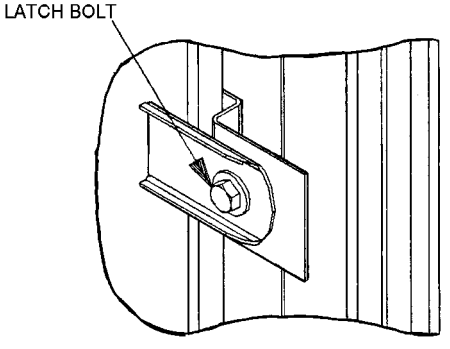


Fig. 39 — Door Latch

I. CLEANING

Inspect unit interior at beginning of each heating and cooling season and as operating conditions require. Remove unit top panel and/or side panels for access to unit interior.

A. Evaporator Coil

Clean as required with a commercial coil cleaner.

B. Condenser Coil

Clean condenser coil annually and as required by location and outdoor-air conditions. Inspect coil monthly — clean as required.

C. Condensate Drain

Check and clean each year at start of cooling season. In winter, keep drains and traps dry.

D. Filters

Clean or replace at start of each heating and cooling season, or more often if operating conditions require. Refer to Table 1 for type and size.

NOTE: The unit requires industrial grade throwaway filters capable of withstanding face velocities up to 625 fpm.

To replace filters, open filter access door (marked with label). Remove inner access panel. Remove plastic filter retainer in between filter tracks by sliding and pulling outward. Remove first filter by sliding out opening in filter track. Locate filter removal tool, which is shipped next to the return air dampers. Use the filter removal tool to remove the rest of the filters.

E. Main Burners

At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames and adjust if necessary. Refer to Main Burners sections on page 28. Check spark gap. See Fig. 40.

F. Flue Gas Passageways

The flue collector box and heat exchanger cells may be inspected by removing gas section access panel (Fig. 2 and 3), flue box cover, collector box, and main burner assembly (Fig. 41 and 42). Refer to Main Burners section on page 28 for burner removal sequence. If cleaning is required, clean all parts with a wire brush. Reassemble using new cerafelt high-temperature insulation for sealing.

G. Combustion-Air Blower

Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bi-monthly to determine proper cleaning frequency.

To inspect blower wheel, remove heat exchanger access panel. Shine a flashlight into opening to inspect wheel. If cleaning is required, remove motor and wheel assembly by removing screws holding motor mounting plate to top of combustion fan housing (Fig. 41 and 42). The motor, scroll, and wheel assembly can be removed from the unit. Remove scroll from plate. Remove the blower wheel from the motor shaft and clean with a detergent or solvent. Replace motor and wheel assembly.

H. Outdoor-Air Inlet Screens

Clean screens with steam or hot water and a mild detergent. Do not use throwaway filters in place of screens.

II. LUBRICATION

A. Compressors

Each compressor is charged with the correct amount of oil at the factory. The correct oil charge is shown in Table 1. If oil is visible in the compressor sight glass, check unit for operating readiness as described in Start-Up section, then start the unit. Observe oil level and add oil, if required, to bring oil level in compressor crankcase up to between ¼ and ⅓ of sight glass during steady operation.

If oil charge is above ⅓ sight glass, do not remove any oil until the compressor crankcase heater has been energized for at least 24 hours with compressor off.

When additional oil or a complete charge is required, use only approved compressor oils:

Petroleum Specialties, Inc. . . . . Cryol 150

Texaco, Inc. . . . . Capella WF-32

Witco Chemical Corp. . . . . Suniso 3GS

IMPORTANT: Do not use reclaimed oil or oil that has been exposed to the atmosphere. Refer to Standard Service Techniques Manual, Chapter 1, Refrigerants section, for procedures to add or remove oil.

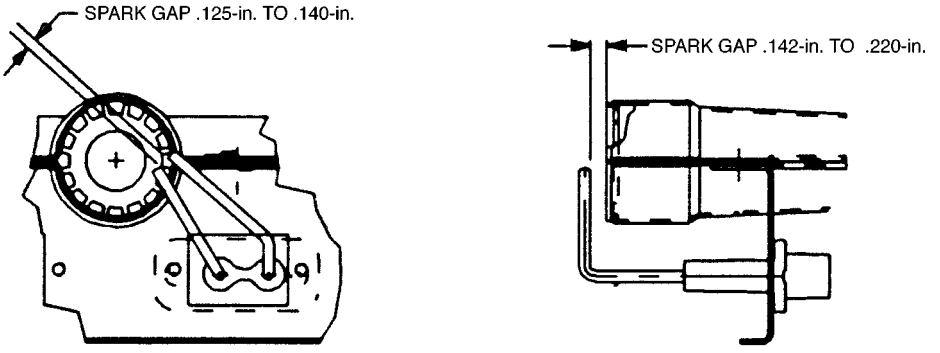
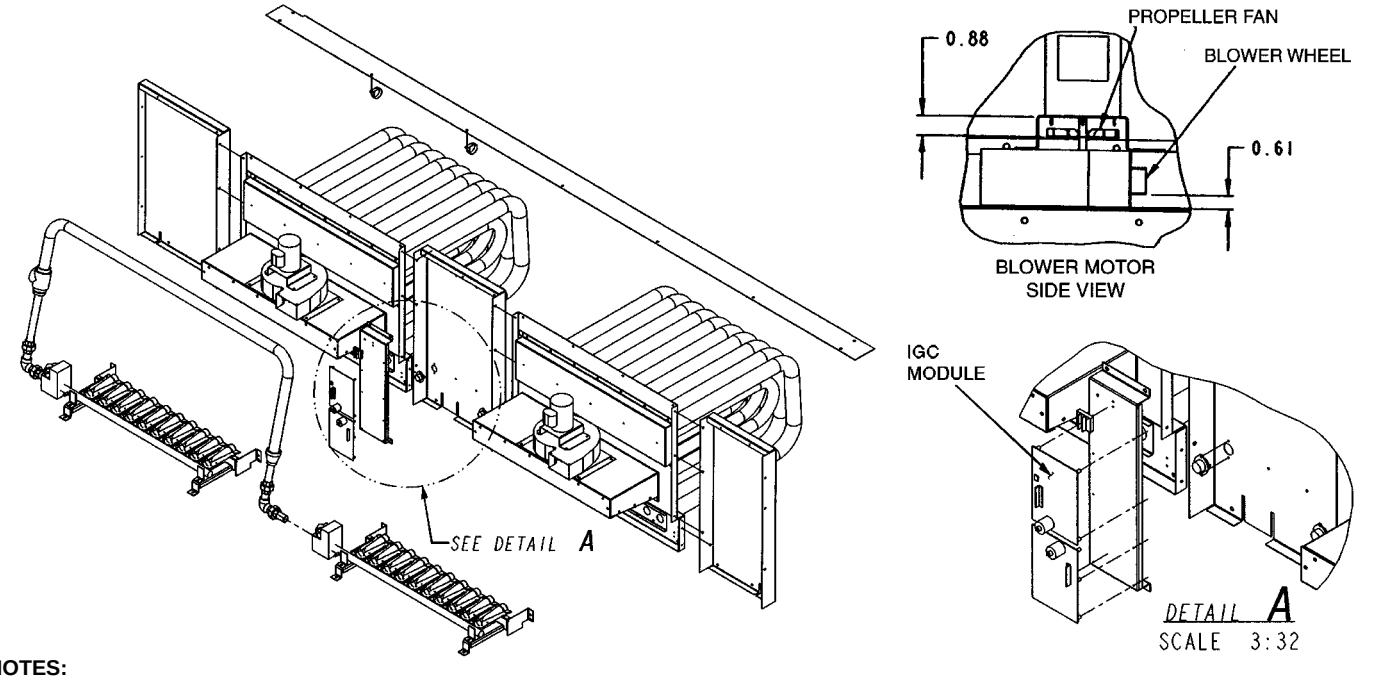


Fig. 40 — Spark Gap Adjustment



NOTES:
1. Torque setscrews on blower wheel to 70 in. lbs ± 2 in. lbs.
2. Torque setscrew on propeller fan to 15 in. lbs ± 2 in. lbs.
3. Dimensions are in inches.

Fig. 41 — Typical Gas Heating Section

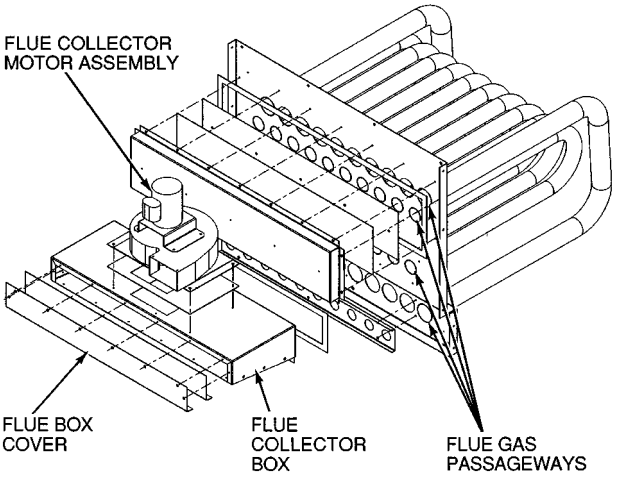


Fig. 42 — Gas Heat Section Details

B. Fan Shaft Bearings

Lubricate the bearings at least twice annually with suitable bearing grease. Do not over grease. Typical lubricants are shown below:

MANUFACTURER	LUBRICANT
Texaco	Regal AFB-2*
Mobil	Mobilplex EP No. 1
Sunoco	Prestige 42
Texaco	Multifak 2

*Preferred lubricant because it contains rust and oxidation inhibitors.

C. Condenser and Evaporator-Fan Motor Bearings

The condenser and evaporator-fan motors have permanently-sealed bearings, so no field lubrication is necessary.

III. EVAPORATOR FAN SERVICE AND REPLACEMENT

1. Turn off unit power.
2. Remove supply-air section panels.
3. Remove belt and blower pulley.
4. Loosen setscrews in blower wheels.
5. Remove locking collars from bearings.
6. Remove shaft.
7. Remove venturi on opposite side of bearing.
8. Lift out wheel.
9. Reverse above procedure to reinstall fan.
10. Check and adjust belt tension as necessary.

IV. EVAPORATOR-FAN MOTOR REPLACEMENT

1. Shut off unit power supply.
2. Remove upper outside panel and open hinged door to gain access to motor.
3. Fully retract motor plate adjusting bolts.
4. Loosen the 2 rear (nearest the evaporator coil) motor plate nuts.
5. Remove the 2 front motor plate nuts and carriage bolts.
6. Slide motor plate to the rear (toward the coil) and remove fan belt(s).
7. Slide motor plate to the front and hand tighten one of the rear motor plate nuts (tight enough to prevent the motor plate from sliding back but loose enough to allow the plate to pivot upward).
8. Pivot the front of the motor plate upward enough to allow access to the motor mounting hex bolts and secure in place by inserting a prop.
9. Remove the nuts from the motor mounting hex bolts and remove motor.
10. Reverse above steps to install new motor.

V. POWER FAILURE

Dampers have a spring return. In event of power failure, dampers will return to fully closed position until power is restored.

VI. REFRIGERANT CHARGE

Amount of refrigerant charge is listed on unit nameplate and in Table 1. Refer to GTAC II; Module 5; Charging, Recovery, Recycling, and Reclamation section for charging methods and procedures.

Unit panels must be in place when unit is operating during charging procedure.

A. No Charge

Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant (refer to Table 1).

B. Low Charge Cooling

Using appropriate cooling charging chart (see Fig. 43), add or remove refrigerant until conditions of the appropriate chart are met. Note that charging chart is different from those normally used. An accurate pressure gage and temperature sensing device are required. Measure liquid line pressure at the liquid line service valve using pressure gage. Connect temperature sensing device to liquid line near the liquid line service valve and insulate it so that outdoor ambient temperature does not affect reading. Indoor-air cfm must be within normal operating range of unit. Take outdoor ambient temperature and read the suction pressure gage. Refer to appropriate chart to determine correct suction temperature. If intersection point on chart is above the curve, add refrigerant. If intersection point on chart is below curve, carefully recover some of the charge. Recheck suction pressure as charge is adjusted.

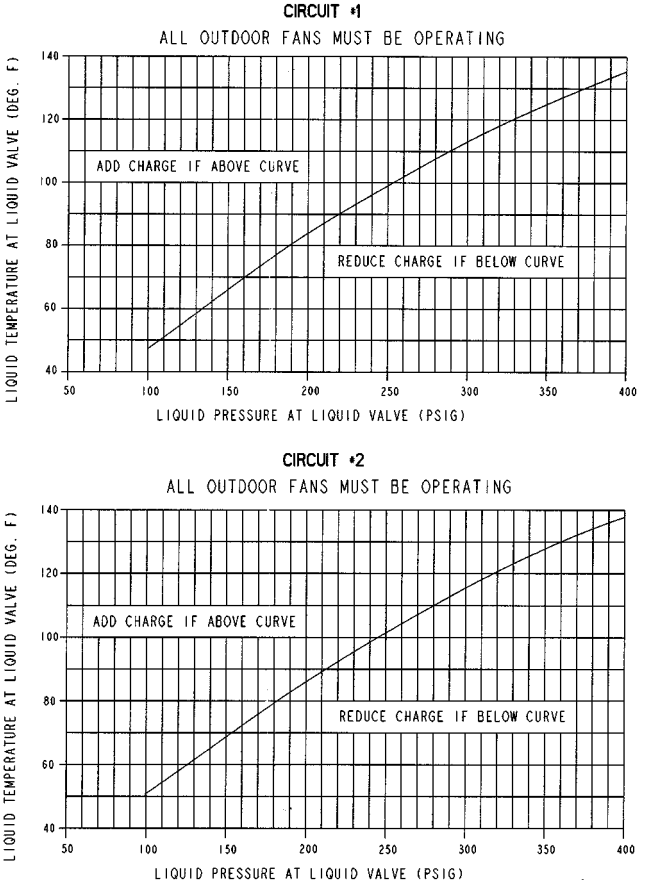


Fig. 43 — Cooling Charging Chart, 580G,H240-360

VII. FILTER DRIER

Replace whenever refrigerant system is exposed to atmosphere.

VIII. THERMOSTATIC EXPANSION VALVE (TXV)

Each circuit has one. It is nonadjustable and is factory set to maintain 10 to 13° F superheat leaving the evaporator coil. Controls flow of liquid refrigerant to the evaporator coils.

IX. PROTECTIVE DEVICES

A. Compressor Protection

Overcurrent

Each compressor has one manual reset, calibrated trip, magnetic circuit breaker. Do not bypass connections or increase the size of the circuit breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

Overtemperature

Each 06D type compressor has an internal protector to protect it against excessively high discharge gas temperatures.

Crankcase Heater

Each compressor has a crankcase heater to prevent absorption of liquid refrigerant by oil in the crankcase when the compressor is idle. Since power for the crankcase heaters is drawn from the unit incoming power, main unit power must be on for the heaters to be energized.

IMPORTANT: After a prolonged shutdown or service job, energize the crankcase heaters for 24 hours before starting the compressors.

B. Evaporator-Fan Motor Protection

A manual reset, calibrated trip, magnetic circuit breaker protects against overcurrent. Do not bypass connections or increase the size of the breaker to correct trouble. Determine the cause and correct it before resetting the breaker. If the evaporator-fan motor is replaced with a different horsepower motor, resizing of the circuit breaker is required. Contact Application Engineering.

C. Condenser-Fan Motor Protection

Each condenser-fan motor is internally protected against overtemperature.

D. High- and Low-Pressure Switches

If either switch trips, or if the compressor overtemperature switch activates, that refrigerant circuit will be automatically locked out. To reset, manually move the thermostat setting.

E. Freeze Protection Thermostat (FPT)

Freeze protection thermostats are located on the evaporator coil for each circuit. One is located at the top and bottom of each circuit. They detect frost build-up and turn off the compressor, allowing the coil to clear. Once the frost has melted, the compressor can be reenergized.

X. RELIEF DEVICES

All units have relief devices to protect against damage from excessive pressures (i.e., fire). These devices are installed on the suction line, liquid line, and on the compressor.

XI. CONTROL CIRCUITS

A. 24-V Circuit

This control circuit is protected against overcurrent by a 3.2-amp circuit breaker (CB4). Breaker can be reset. If it trips, determine cause of trouble before resetting.

B. 115-V Circuit

This control circuit is protected against overcurrent by a 5.0-amp circuit breaker (CB3). Breaker can be reset. If it trips, determine cause of trouble before resetting.

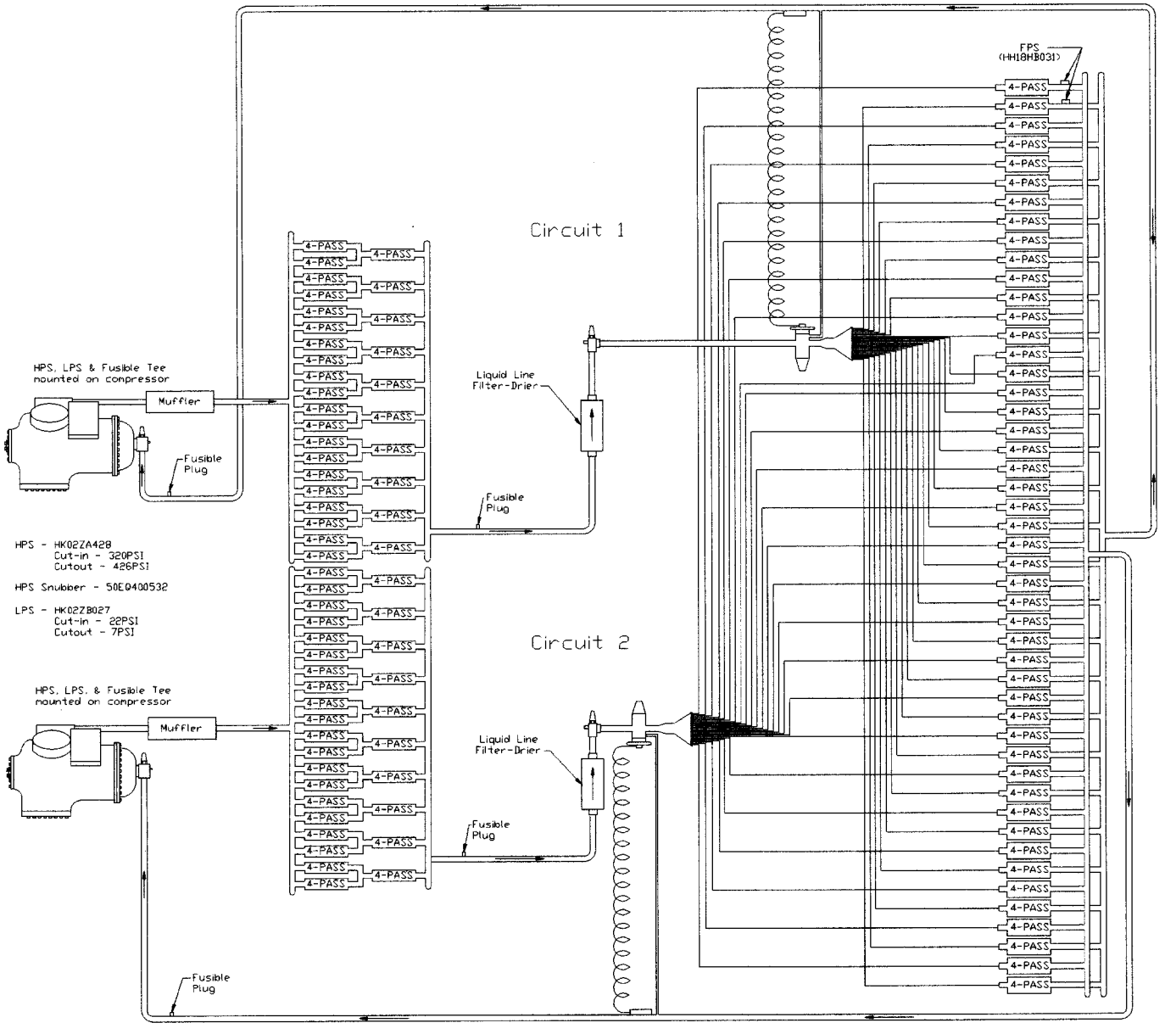
XII. COMPRESSOR LOCKOUT LOGIC

If any of the safeties trip, the circuit will automatically reset (providing the safety has reset) and restart the compressor in 15 minutes. If any of the safeties trip 3 times within a 90-minute period, then the circuit will be locked out and will require manual resetting by turning off either the unit disconnect or the control circuit breaker.

XIII. REPLACEMENT PARTS

A complete list of replacement parts may be obtained from any distributor upon request.

Typical refrigerant circuiting diagram is shown in Fig. 44.



LEGEND

FPS — Freeze Protection Switch
HPS — High-Pressure Switch
LPS — Low-Pressure Switch

Fig. 44 — Typical Refrigerant Circuiting

I. DIAGNOSTIC LEDs (Light-Emitting Diodes)

There are 3 LEDs (red, yellow, and green) on the lower right hand side of the control board. The red light is used to check unit operation and alarms. A constant pulse is normal unit operation. A series of quick blinks indicates an alarm. Refer to Table 12 for a description of alarms. The yellow and green LEDs have no significance on 580G,H units.

Table 12 — Control Board LED Alarms

LED BLINKS	ERROR CODE	DESCRIPTION	TROUBLESHOOTING COMMENTS
1		Normal Operation	The control board flashes the red LED in one-second intervals when the board is operating properly. Make sure DIP switch 3 is closed.
2	HF-13	Compressor 1 Safety	The high or low pressure safety switch for compressor no. 1 has opened for 3 seconds. The error will be cleared and compressor no. 1 will be allowed to turn on in 15 minutes. If the safeties have been tripped 3 times in 90 minutes, compressor no. 1 will be locked out until the control board has been manually reset.
3	HF-14	Compressor 2 Safety	The high or low pressure safety switch for compressor no. 2 has opened for 3 seconds. The error will be cleared and compressor no. 2 will be allowed to turn on in 15 minutes. If the safeties have been tripped 3 times in 90 minutes, compressor no. 2 will be locked out until the control board has been manually reset.
4	HF-15	Thermostat Failure	The thermostat is calling for both heating and cooling at the same time. The unit will operate on a first call basis and will automatically reset.
5	HF-05	SAT Thermistor Failure	The supply-air temperature (SAT) sensor has failed. First check for wiring errors, then replace sensor.
6	HF-06	OAT Thermistor Failure	The outside-air temperature (OAT) sensor has failed. First check for wiring errors, then replace sensor.
7	HF-03	DIP Switch 2 is Open	Close DIP switch 2.
8	HF-12	DIP Switch 1 is Open	Close DIP switch 1.
9	SE-05	Loss of Communications with Expansion Board	Communications between the expansion board and the control board have been interrupted. Ensure that an expansion board is installed and wired using the wire harness supplied with the expansion module. If an expansion board is not used, ensure that DIP switch position 3 is in the closed position and reset power.
10	HF-16	Control Board Failure	Generated when hardware has failed on control board. Replace the control board.
11	HF-17	Expansion Board Failure	Generated when hardware has failed on the expansion board. Replace the expansion board.

LEGEND

DIP — Dual In-Line Package
LED — Light-Emitting Diode

II. ERROR CODE SUMMARY

A summary of the error codes is listed in Table 13. If more than one error code exists, they will be displayed on the LED of the IGC board in sequence. Fault history is deleted when power is turned off.

Table 13 — IGC Board Error Code Summary

INDICATION	ERROR MODE
ON	NORMAL OPERATION
OFF	HARDWARE FAILURE
1 FLASH	FAN ON/OFF DELAY MODIFIED
2 FLASHES	LIMIT SWITCH FAULT
3 FLASHES	FLAME SENSE FAULT
4 FLASHES	4 CONSECUTIVE LIMIT SWITCH FAULTS
5 FLASHES	IGNITION LOCKOUT FAULT
6 FLASHES	INDUCED DRAFT MOTOR FAULT
7 FLASHES	ROLLOUT SWITCH FAULT
8 FLASHES	INTERNAL CONTROL FAULT

III. INPUT AND OUTPUT CHANNEL DESIGNATIONS

Table 14 shows the input and output channel designations.

The Integrated Gas Controls for heating and cooling are shown in Fig. 45.

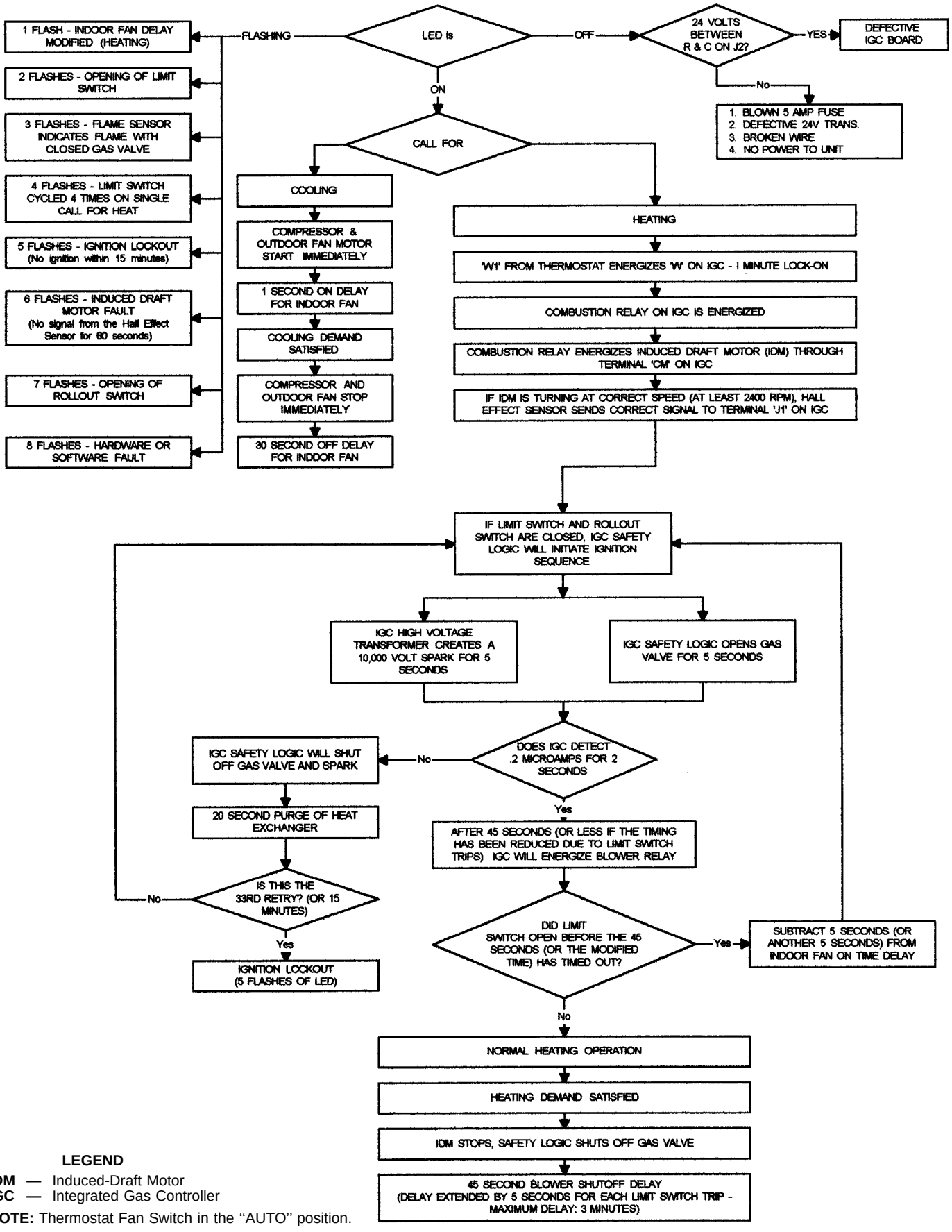
Table 14 — I/O Channel Designations Base Module

TERMINAL NO.	ASSIGNMENT
T1-2	—
T3-4	—
T5-6	OAT — 5KΩ Thermistor
T7-8	SAT — 5KΩ Thermistor
T9-10	—
T11-12	—
T13-14	—
T15-16	—
T17-25	Y1 — DI (24 vac)
T18-25	Y2 — DI (24 vac)
T19-25	W1 — DI (24 vac)
T20-25	W2 — DI (24 vac)
T21-25	G — DI (24 vac)
T22-25	Compressor 1 Safety — DI (24 vac)
T23-25	Compressor 2 Safety — DI (24 vac)
T24-25	Outside Air Enthalpy — DI (24 vac)
T26-27	Economizer Pos. — AO (4-20 mA)
T28-29	Heat 1 Relay — DO (24 vac)
T30-29	Heat 2 Relay — DO (24 vac)
T31-32	CV Power Exhaust 1/Modulating Pwr Exht — DO (115 vac)
T33-32	CV Power Exhaust 2 — DO (115 vac)
T34-35	Condenser Fan — DO (115 vac)
T36-35	OFC2 — DO (115 vac)
T37-38	—
T39-38	—
K1	Indoor Fan Relay — DO (HV)
K2	Compr. 1 — DO (HV)
K3	Compr. 2 — DO (HV)

LEGEND

AO — Analog Output
CV — Constant Volume
DI — Direct Input
DO — Direct Output
HV — High Voltage
KΩ — Kilo Ohms
OAT — Outdoor Air Thermistor
OFC — Outdoor (Condenser) Fan Contactor
SAT — Supply Air Thermistor
T — Terminal

NOTE: For 4 to 20 mA signals, all even numbered terminals are negative (−) polarity and all odd numbered terminals are positive (+) polarity.



LEGEND

IDM — Induced-Draft Motor
IGC — Integrated Gas Controller

NOTE: Thermostat Fan Switch in the "AUTO" position.

Fig. 45 — IGC Control (Heating and Cooling)

LEGEND FOR FIG. 46-50

AHA	—	Adjustable Heat Anticipator
BP	—	Building Pressure
BR	—	Burner Relay
C	—	Contactor, Compressor
CAP	—	Capacitor
CB	—	Circuit Breaker
CC	—	Cooling Compensator
CCB	—	Compressor Circuit Breaker
CCH	—	Crankcase Heater
COM	—	Common
COMP	—	Compressor Motor
CR	—	Control Relay
CV	—	Constant Volume
DM	—	Damper Motor
EC	—	Enthalpy Control
EQUIP	—	Equipment
FLA	—	Full Load Amps
FPT	—	Freeze Protection Thermostat
FU	—	Fuse
GND,GRD	—	Ground
GVR	—	Gas Valve Relay
HPS	—	High-Pressure Switch
HR	—	Heat Relay
HS	—	Hall Effect Sensor
HV	—	Heat Valve
I	—	Ignitor
IDM	—	Induced-Draft Motor
IFC	—	Indoor Fan Contactor
IFCB	—	Indoor Fan Circuit Breaker
IFM	—	Indoor-Fan Motor
IFR	—	Indoor-Fan Relay
IGC	—	Integrated Gas Unit Controller
IP	—	Internal Protector
L	—	Light
LPS	—	Low-Pressure Switch
LS	—	Limit Switch
MGV	—	Main Gas Valve
NC	—	Normally Closed
NEC	—	National Electrical Code
NO	—	Normally Open
OAT	—	Outdoor-Air Thermostat
OD	—	Outside Diameter
OFC	—	Outdoor-Fan Contactor
OFM	—	Outdoor-Fan Motor
PEC	—	Power Exhaust Contactor
PEM	—	Power Exhaust Motor
PES	—	Power Exhaust Sequencer
PESC	—	Power Exhaust Sequencer Controller
PL	—	Plug Assembly
RS	—	Rollout Switch
SAT	—	Supply-Air Thermistor
SW	—	Switch
TB	—	Terminal Block
TC	—	Thermostat Cooling
TH	—	Thermostat Heating
TRAN	—	Transformer

Terminal (Marked)

Terminal (Unmarked)

Terminal Block

Splice

Factory Wiring

Field Wiring

To Indicate Common Potential Only, Not To Represent Wiring

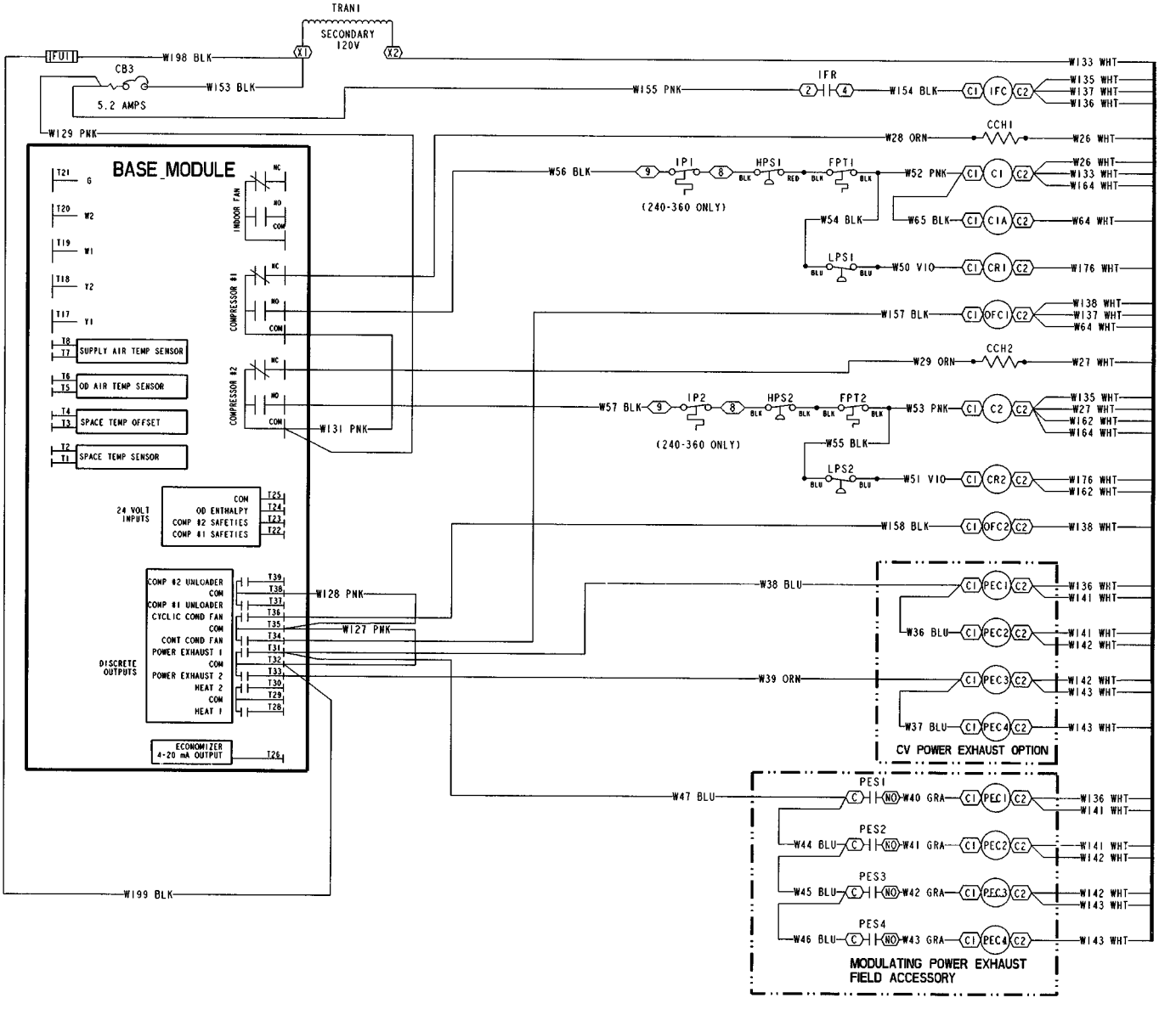
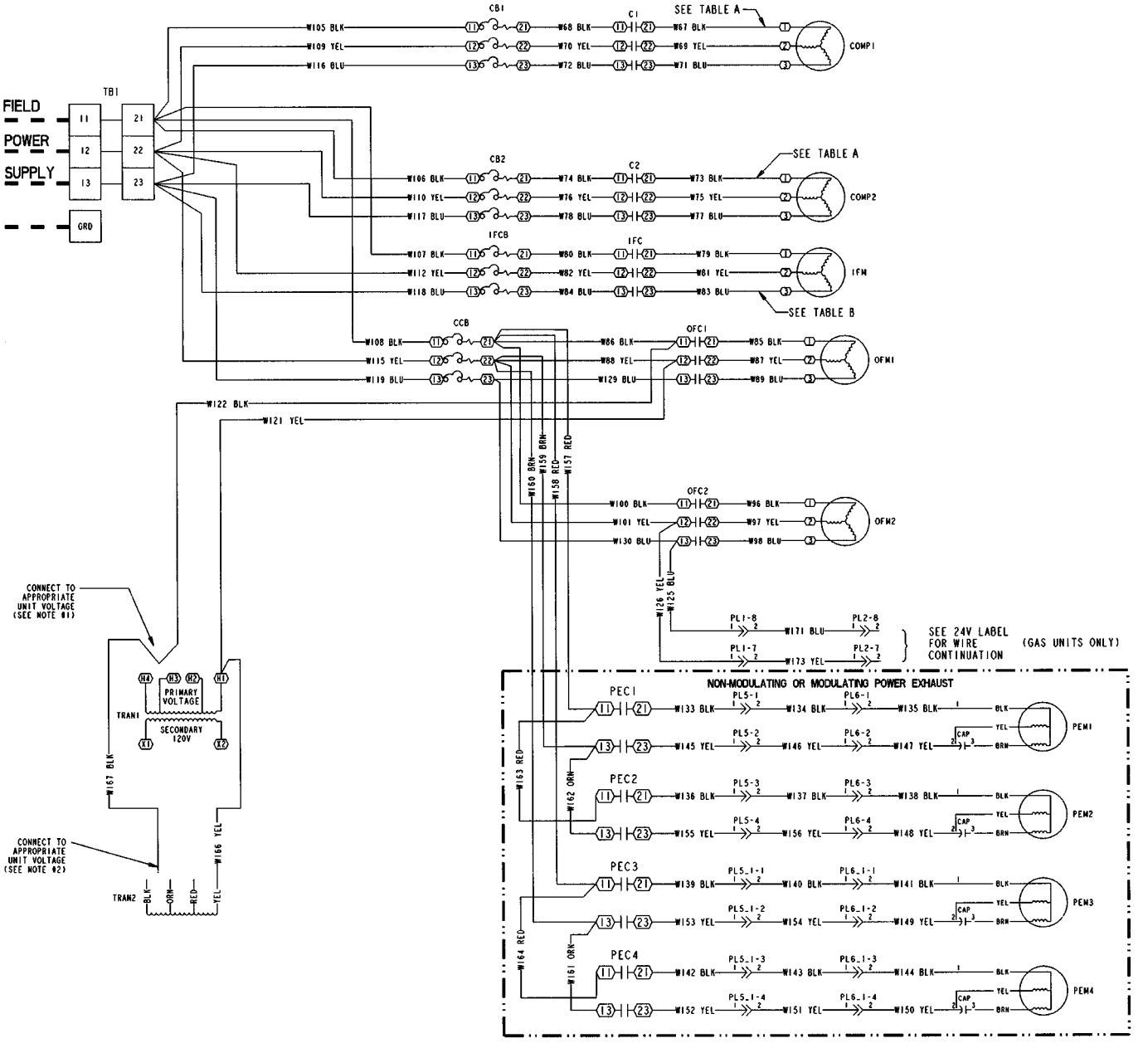


Fig. 46 — 115 V Control Circuit Schematic; 580G,H240-360



NOTES:

1. Connect TRAN1 to H4 for 460 v units. Connect to H3 for 230 v. If 208/230 v units are run with a 208 v power supply connect to H2.
2. Connect TRAN2 to black lead for 460 v units. Connect to orange lead for 230 v units. If 208/230 v units are run with a 208 v power supply connect to red lead.
3. Circuit breaker must trip amps are equal to or less than 156% FLA for CB1 and CB2. All others are 140%.
4. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
5. Compressors and/or fan motors are thermally protected.
6. Three-phase motors are protected against primary single phasing conditions.

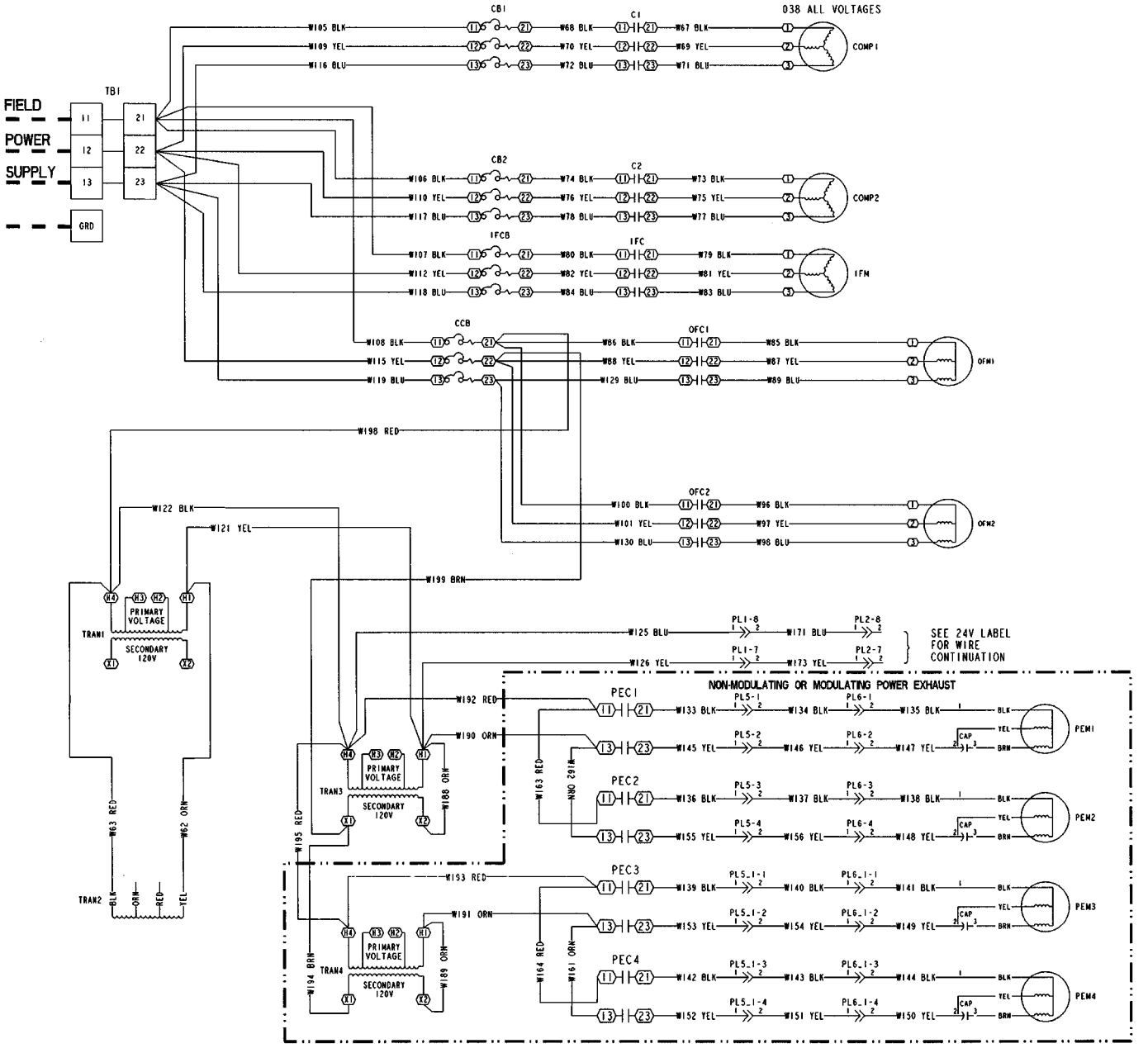
TABLE A

The Following Compressors Have Two Parallel Wires Run From TB1 to the Compressors		
Compressor Model	**Voltage**	**Wire Quantity**
06D-537	208-230-3-60	2

TABLE B

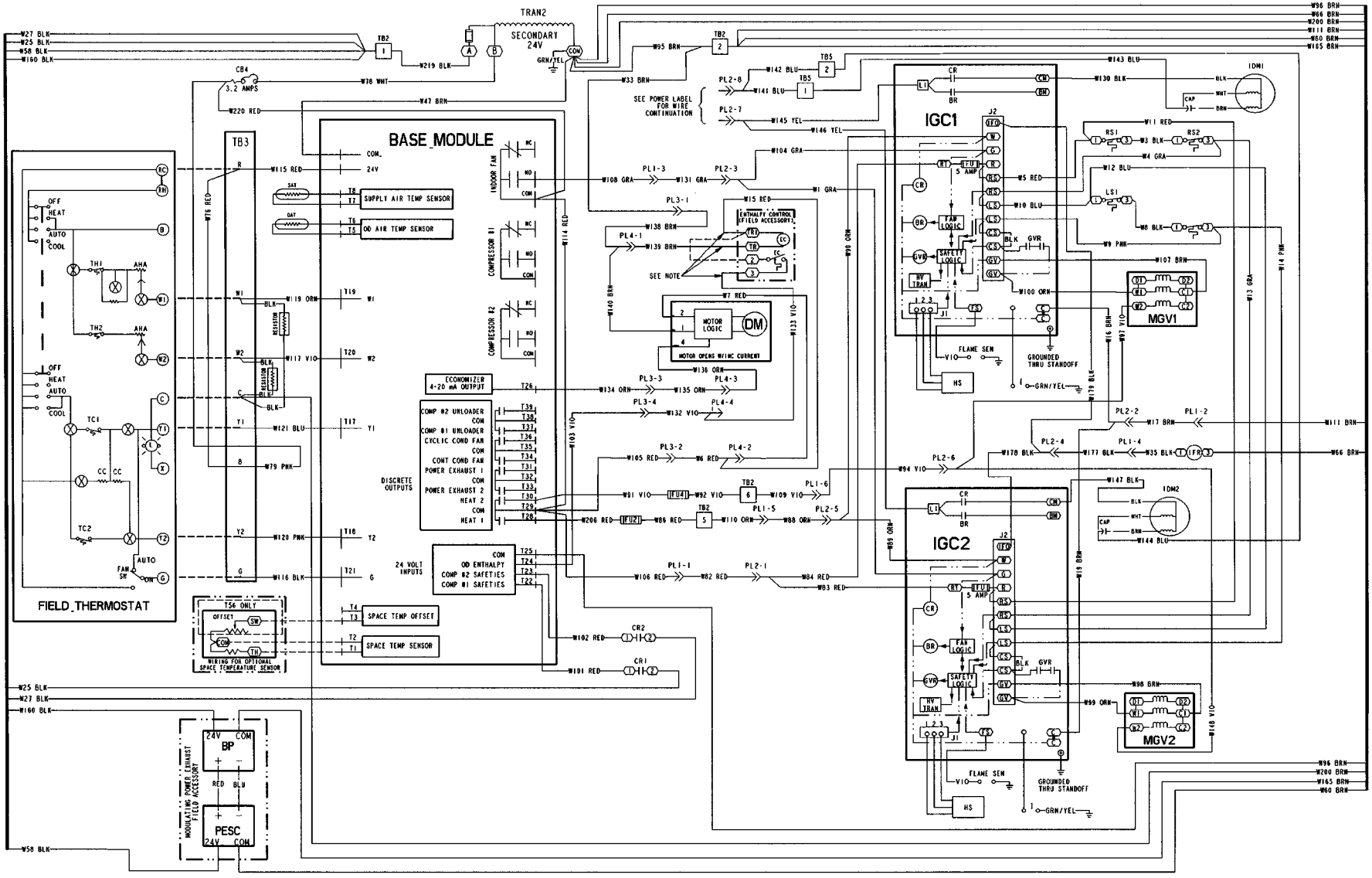
The Following Fan Motors Have Two Parallel Wires Run From TB1 to the Fan Motors		
Indoor Motor	**Voltage**	**Wire Quantity**
20 HP	208-230-3-60	2

Fig. 47 — Power Schematic; 580G,H240-360 — 208/230-3-60 and 460-3-60



NOTES:
1. Connect TRAN1 to H4 for 575V units.
2. Connect TRAN2 to black lead for 575V units.
3. Circuit breaker must trip amps are equal to or less than 156% FLA for CB1 and CB2. All others are 140%.
4. If any of the original wire furnished must be replaced, it must be replaced with Type 90 C wire or its equivalent.
5. Compressors and/or fan motors are thermally protected.
6. Three-phase motors are protected against primary single phasing conditions.

Fig. 48 — Power Schematic; 580G,H240-360 — 575-3-60



NOTE: Red wire and violet wire are spliced together at the factory. The brown wire has a wire nut added at the factory.

Fig. 49 — 24 V Control Schematic; 580G,H240-360

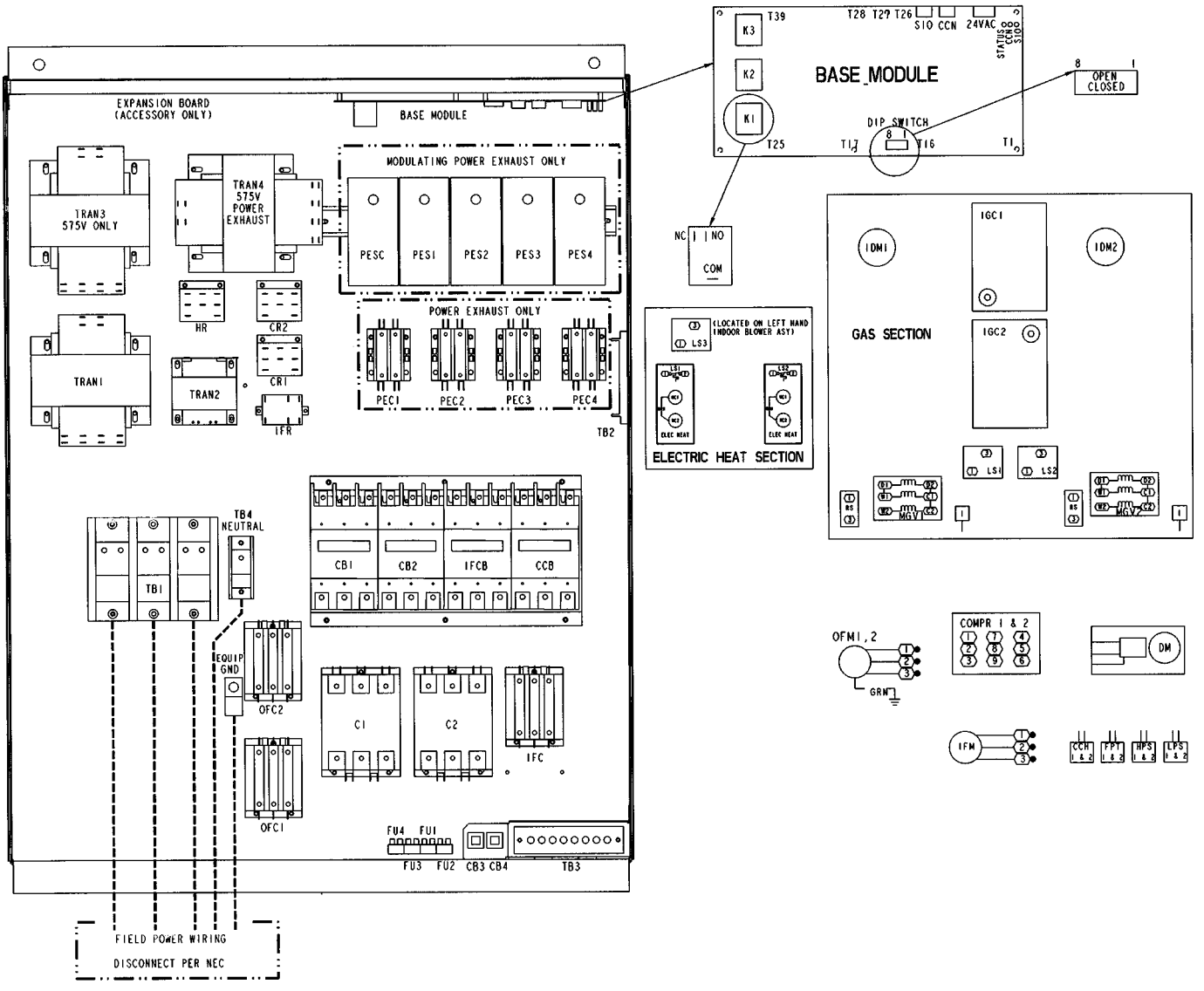


Fig. 50 — Component Arrangement; 580G,H240-360

PACKAGED SERVICE TRAINING

Our packaged service training programs provide an excellent way to increase your knowledge of the equipment discussed in this manual. Product programs cover:

- Unit Familiarization
- Installation Overview
- Maintenance
- Operating Sequence

A large selection of product, theory, and skills programs is available. All programs include a video cassette and/or slides and a companion booklet. Use these for self teaching or to conduct full training sessions.

For a free Service Training Material Catalog (STM), call 1-800-962-9212. Ordering instructions are included.

START-UP CHECKLIST

MODEL NO.: _____ SERIAL NO.: _____

SOFTWARE VERSION (SEE FIG. 11) _____ TECHNICIAN: _____

DATE: _____

PRE-START-UP:

☐ VERIFY THAT DIP SWITCH SETTINGS ARE CORRECT

☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT

☐ REMOVE ALL SHIPPING HOLDDOWN BOLTS AND BRACKETS PER INSTRUCTIONS

☐ VERIFY INSTALLATION OF ECONOMIZER HOOD

☐ VERIFY INSTALLATION OF ALL OPTIONS AND ACCESSORIES

☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTRUCTIONS

☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT

☐ CHECK GAS PIPING FOR LEAKS

☐ CHECK THAT INDOOR-AIR FILTERS ARE CLEAN AND IN PLACE

☐ VERIFY THAT UNIT IS LEVEL WITHIN TOLERANCES

☐ CHECK FAN WHEELS AND PROPELLERS FOR LOCATION IN HOUSING/ORIFICE, AND VERIFY SETSCREW IS TIGHT

☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED

☐ VERIFY THAT SUCTION, DISCHARGE, AND LIQUID SERVICE VALVES ON EACH CIRCUIT ARE OPEN

START-UP:

ELECTRICAL

SUPPLY VOLTAGE L1-L2 _____ L2-L3 _____ L3-L1 _____

COMPRESSOR AMPS — COMPRESSOR NO. 1 L1 _____ L2 _____ L3 _____

— COMPRESSOR NO. 2 L1 _____ L2 _____ L3 _____

SUPPLY FAN AMPS _____ EXHAUST FAN AMPS _____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ F DB (Dry Bulb)

RETURN-AIR TEMPERATURE _____ F DB _____ F WB (Wet Bulb)

COOLING SUPPLY AIR _____ F

GAS HEAT SUPPLY AIR _____ F

PRESSURES

GAS INLET PRESSURE _____ IN. WG

GAS MANIFOLD PRESSURE STAGE NO. 1 _____ IN. WG STAGE NO. 2 _____ IN. WG

REFRIGERANT SUCTION CIRCUIT NO. 1 _____ PSIG CIRCUIT NO. 2 _____ PSIG

REFRIGERANT DISCHARGE CIRCUIT NO. 1 _____ PSIG CIRCUIT NO. 2 _____ PSIG

☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS ON PAGE 31

GENERAL

☐ SET ECONOMIZER MINIMUM VENT POSITION TO JOB REQUIREMENTS

☐ ENSURE DRIVES OPERATE WITHIN LIMITS OF FAN PERFORMANCE TABLES.

HIGH-PRESSURE SWITCH SETTING _____ PSIG

LOW-PRESSURE SWITCH SETTING _____ PSIG

MOTOR PULLEY PART NUMBER _____

FAN PULLEY PART NUMBER _____

BELT PART NUMBER _____

BELT SIZE _____ in.

FILTER QUANTITY _____

FILTER SIZES _____ in.

ADDITIONAL NOTES:

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE